MAY 21, 1956

STEEL
The Metalworking Weekly

A PENTON PUBLICATION

# More Nickel On the Way

We're spending $5 million a year on exploration, says Inco President H. S. Wingate . . . page 80

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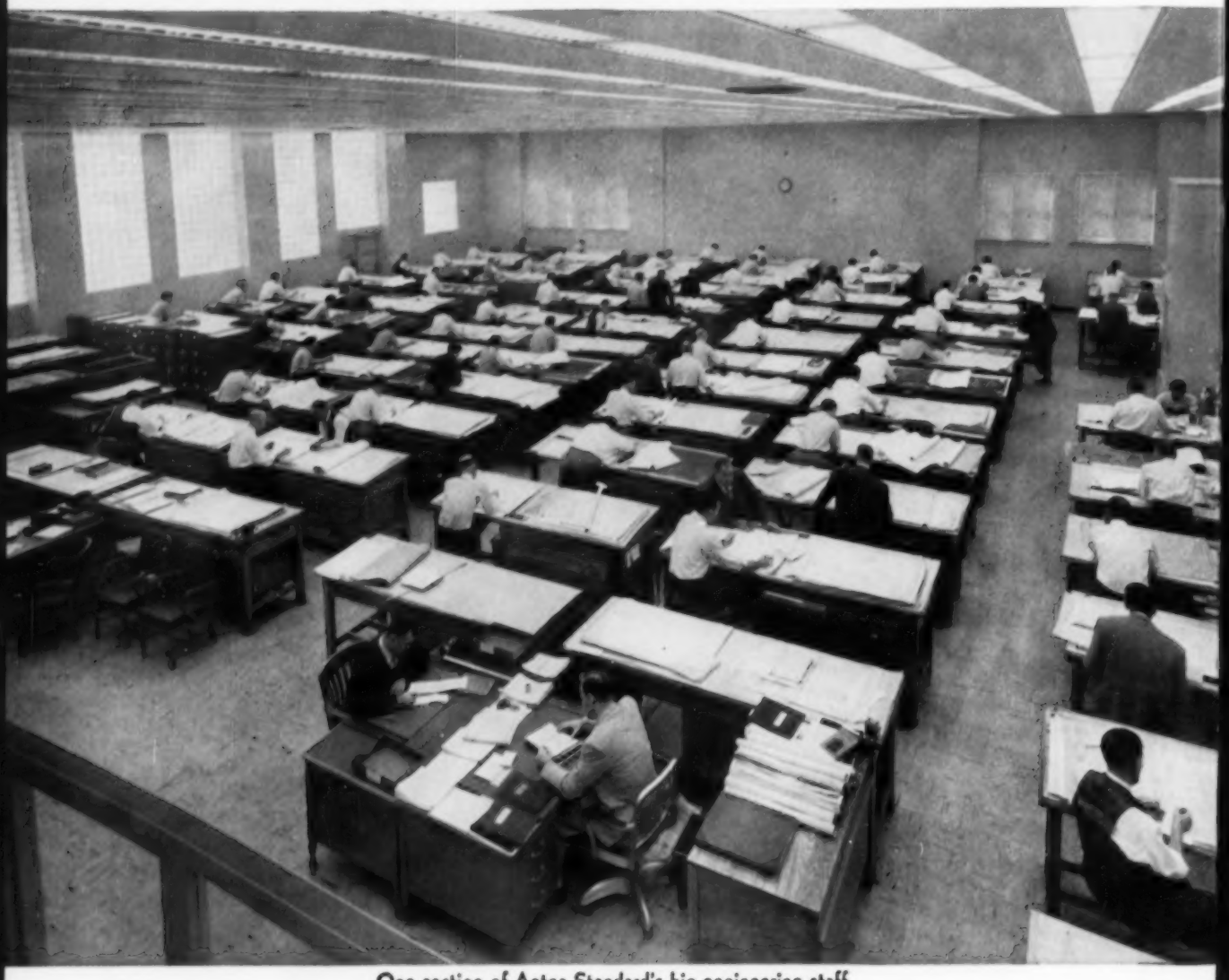
54 YEARS OF DESIGNING AND BUILDING EQUIPMENT



One section of Aetna-Standard's big engineering staff

# men at work for ONE PURPOSE

To develop better equipment and more efficient equipment for production of steel, copper, brass, aluminum, in the form of higher quality pipe and tubing, tin plate, galvanized sheet and strip, cold drawn bars and tubes and many other products.

These engineering **idea men** have one purpose — to transform ideas into equipment as exemplified by the Rotary Hot Saw, the Tube Expander, the 5-Draw Drawbench and many ideas of Continuous Galvanizing, Continuous Electrolytic Tinning and Finishing Equipment.

They do not work alone. Many of the ideas for new equipment originate with you, the customer. The Aetna engineering idea staff refines and develops the idea into equipment. This ability to work with customers is one of Aetna's best assets. . . . That's why Aetna-Standard always has been known as **the idea people.**

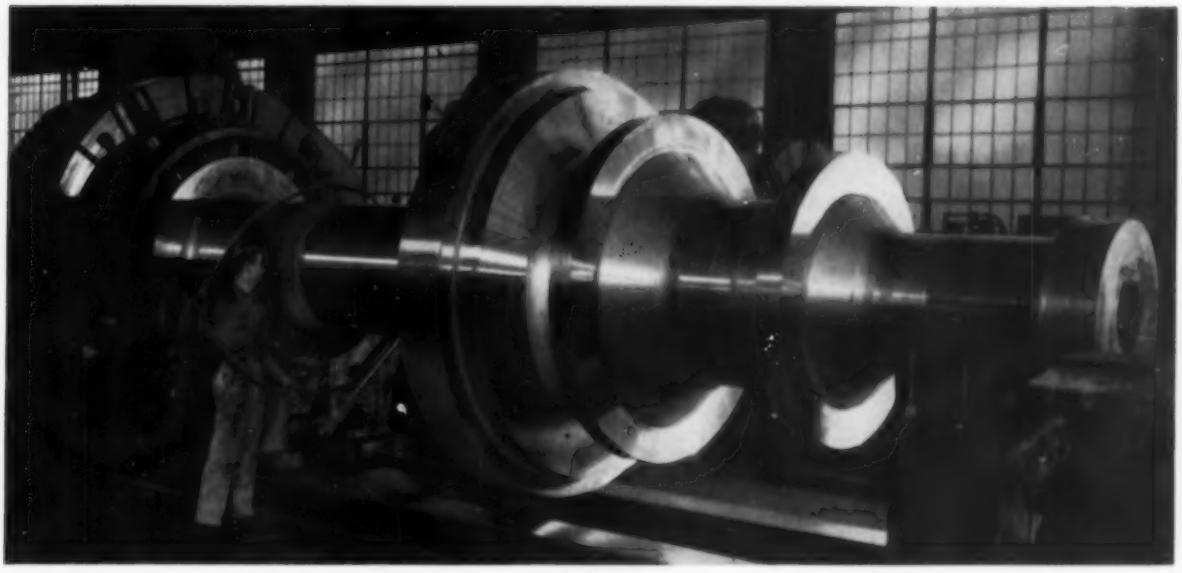
# AETNA • STANDARD

**THE AETNA-STANDARD ENGINEERING COMPANY**

GENERAL OFFICES: PITTSBURGH, PA. PLANTS: ELLWOOD CITY, PA., WARREN, OHIO

CONTINUOUS GALVANIZING LINES • CONTINUOUS ELECTROLYTIC TINNING LINES • SIDE TRIMMING AND SHEAR LINES AND OTHER FINISHING EQUIPMENT • CONTINUOUS BUTT WELD PIPE MILLS • SEAMLESS TUBE MILLS • DRAWBENCHES AND OTHER COLD DRAW EQUIPMENT • ROLLS AND CASTINGS • EXTRUDERS, MILLS, PRESSES FOR RUBBER AND PLASTIC

# Their job is to help make power



Here are two giants of steel that were recently created in the Bethlehem shops. Though dissimilar in shape and dimensions, their basic business is the same—to help make power for the country's growing needs.

That big shaft will do an important job in a Western hydroelectric project. A forging made of carbon-vanadium steel, it weighs approximately 61 tons. Its overall length exceeds 22 ft.

The vaned runner in the other illustration is a foundry product. Like the forging, it's a whopper, weighing 49 tons. It too is earmarked for a hydroelectric installation.

Through the years Bethlehem has furnished many large components for use in power production. Countless Bethlehem forgings and castings are also in service in other industries. Some of these pieces are huge—but please remember, we're equally well equipped to turn out small items, too. For instance, some of the drop forgings we make are small enough to tuck into your vest pocket.

When your needs call for either forgings or castings, we hope you'll get in touch with us. Whether your order runs to tonnage or is small, we'll give it all we've got!

BETHLEHEM STEEL COMPANY
BETHLEHEM, PA.

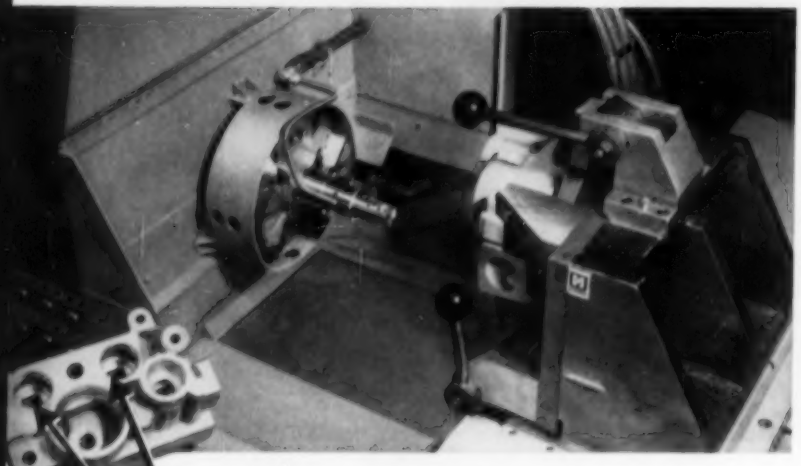
*On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. Export Distributor: Bethlehem Steel Export Corporation*

BETHLEHEM STEEL

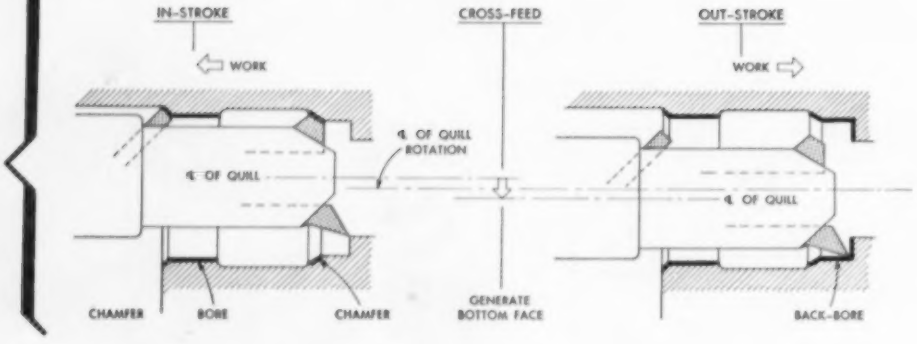
**BETHLEHEM STEEL**

## Heald BORIZING boosts production of aircraft filter bodies

# from 8 PARTS PER HR. to 33 PARTS PER HR.



*another example of how a simple Borizing setup can do a better job, faster, and at much lower cost*




THE fixture and tooling setup in the photo above looks like a very simple one — and it IS! Yet this single, three-point quill Borizes two chamfers, two I.D.s and a bottom face on each of two identical bores in an aluminum aircraft filter body, all in a single, fully-automatic cycle with only one chucking of the part.

As the diagrams show, the job is done with a cross feed unit on the Borizing quill to present the tooling to the work in the proper sequence. Auto indexing of cross slide positions work for Borizing the two identical bores in sequence.

Compared to the previous method of doing the same job, this Model 221 Bore-Matic increased production from 8 parts to 33 parts per hour, with closer tolerances, better finish, easier operation and less maintenance.

The *simplicity* and *versatility* of Heald Borizing permits important savings on an almost unlimited range of work and finishing operations. Another big reason why it *pays* to come to Heald.

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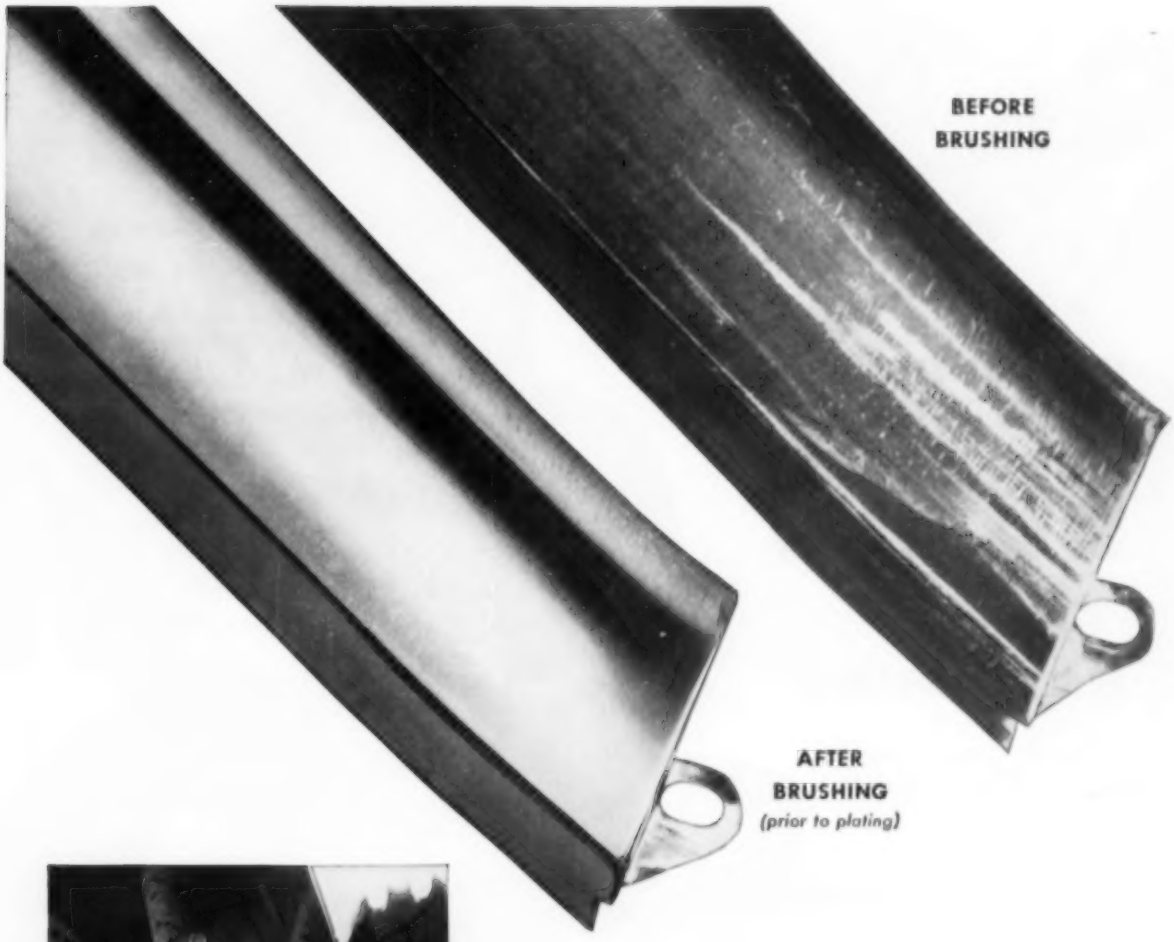

*An important manufacturer of trim uses a continuous 7-head-line of Osborn Fascut® Brushes to finish trim prior to plating at the rate of 1,000 feet per hour.*

# Keeping in top trim

MAKING a metal product, you undoubtedly use the smooth, mirror-lustre of chrome trim to add eye appeal—and buy appeal—to your product.

And you can further enhance the top-quality appearance of your trim parts—and your product—using Osborn power brushing to produce a perfect, unmarred finish prior to plating.

An **O**sborn **B**rushing **A**nalysis of your other finishing operations may point up additional ways power brushing can help improve quality. Write *The Osborn Manufacturing Company, Dept. G-45, 5401 Hamilton Avenue, Cleveland 14, Ohio.*

Osborn Brushes

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Industrial Truck Batteries

There are three big reasons why it pays to choose Gould Research-Built Batteries:

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2. Strategically located Gould plants assure prompt attention to your battery requirements.
3. Gould Field Engineering Service, finest in the industry, nation-wide in scope, is as close to you as your telephone, always ready to see that your batteries are properly cared for and maintained . . . that you get maximum battery performance.

The Material Handling Institute's Exposition
Cleveland, Ohio
Public Auditorium
1956
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GOULD-NATIONAL BATTERIES, INC.
Trenton 7, N. J.

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STEEL
The Metalworking Weekly

MAY 21, 1956
Vol. 138 No. 21

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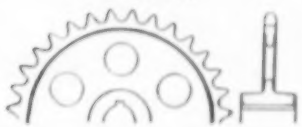
Which Sprocket will live longer



Here is double pitch chain applied on both a single and double duty tooth form sprocket. The single duty sprocket is necessary for use with double pitch chains using oversize rollers. The double duty sprocket used with double pitch chain having standard diameter rollers, has another 'life' by simply moving the chain up one tooth after it is worn in its first position. Double duty cutting in many cases, doubles the life expectancy of a sprocket.

NEW CATALOG

*Information like this, plus other valuable chain data yours free. Write Acme Chain Dept. 10A, Holyoke, Mass.*

Acme Chain Corporation
HOLYOKE MASSACHUSETTS

# WHAT'S NEW in REFRACTORIES for the STEEL INDUSTRY

There is something new under the sun. It's new **C & G Mix** by WALSH . . . an economical mix for lining and patching ladle wells in open hearth and electric furnace shops. Formulated to offer greater protection against washouts, it has remarkably easy workability and is low in cost, affording you greater dollar value through increased service life.

Packed dry in 100 lb. bags, Walsh **C & G Mix** is also available in bulk.

*Write for complete details.*

***Specialists in Refractories of High Bulk Density and Low Porosity***

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FOR OVER 60 YEARS MANUFACTURERS OF HIGH GRADE REFRACTORIES


# behind the scenes

## Wizard, 1st Class

Roger M. Blough, chairman, U.S. Steel Corp., gave a luncheon last Dec. 7 for members of the financial and industrial press. To some, that date is one that will long live in infamy, but to STEEL's New York editor, Ben Price, it always will serve to remind him of his extrasensory perception. Yes, Ben is a fully qualified wizard, endorsed as such by no less an authority than the U.S. Steel Corp.

The way we get the story, the boys were sitting about the table at the conclusion of the meal, licking their chops and loosening their belts, when Mr. Blough proposed a guessing game. He requested his guests to list their opinions on two counts: 1. Would Eisenhower accept renomination? 2. When would he announce his decision?

Ben went into a huddle with himself, muttered an incantation to Set (an evil spirit with a beast's head and pointed snout), looked at his watch and boldly declared that on Mar. 1 Eisenhower would announce his intention to seek renomination as the Republican presidential candidate.

Just prior to the beginning of a press conference on Apr. 24 at the New York offices of the U.S. Steel Corp., Mr. Blough remarked that he would like to take a moment at the end to "perform a little ceremony." When the time came, he explained the business about the guessing game, said that Ben had come closest to the truth, and presented him with a beautiful Steuben glass owl and a silver key ring bearing a disc. On one side of the disc was inscribed: "The Wizard of the Crystal Ball," and under that, "U.S. Steel Corp." On the reverse side was Ben's name.

Eisenhower announced at 10:52 a.m. on Feb. 29. "If it hadn't been leap year," said Ben sadly, "I would have been dead right. I must have forgotten to wind my watch."

## The Trumpet Sounds

In the olden, golden days great knights kept heralds on the payroll to publicly sing their praises. Whenever the knight appeared, the herald would precede him, shouting about the puissance, proficiency and potency of his employer. Things really haven't changed too much over the centuries: STEEL is the knight, and ol' Shrdlu is the herald, and here is the news:

In *Industrial Marketing's* 18th annual editorial competition for business papers, in which more than 600 entries astounded the judges, STEEL won two out of a total of five plaques, together with an award of merit for editorial excellence. The first plaque was for the best series of articles: STEEL's 1955 Program for Management, special reports on the ten most critical issues facing metalworking management last year. The second plaque was for best original research. It appears in an article, "When to Re-Equip," June 20, 1955.

Prancing before STEEL, oblivious to the rents in our hose and buskin, we are really blowing that horn, eight to the bar. Six hundred entries competing for five plaques, and STEEL snatches two of them! And since the start of the competitions in 1938, STEEL has latched on to 21 awards, a feat matched only by *Machine Design*, another Penton publication. Incidentally, in the recent competition, Penton publications were well represented. *Automation* won a certificate for a series of articles, and *Machine Design* won a plaque for a best single article and a certificate for a best series of articles.

## Steppe Steps

The weighted parcels were, in their order of weight, water, blood, earth, potatoes, gold dust, oats, barley, lime, flour, beef. How's your Russian? It's as far from Omsk to Umsk as from Amsk to Monsk. It's as far from Minsk to Munsk as from Mansk to Monsk. Monsk is on a straight road north from Minsk to Umsk. Monsk is on a straight road east from Omsk to Munsk. Amsk is 8 miles north of Omsk and 8 miles west of Umsk. Mansk is 6 miles south of Munsk and 6 miles east of Minsk. How far is it from Omsk to Minsk? How far is it from Umsk to Munsk?

*Shrdlu*

(Metalworking Outlook—Page 63)

# B.F.Goodrich

# They'll make shiny new cars out of that "red dirt"

***A typical example of B. F. Goodrich improvement in rubber***

THAT stream of "red dirt" is iron ore. Giant-size machines, each taking 17-ton bites at a time, unload the ship. But the chunks of ore hit the conveyor belts on the unloader with such force that belts used to last only a season or two. Sometimes there were lumps weighing half a ton or more. The rubber would be cut and the fabric weakened.

Then engineers decided to try B. F. Goodrich cord belts, designed to take smashing blows. Some of them have lasted three years, some four years—three or four times as long as former belts. The belt in the picture is the newest of all. Engineers specified a B. F. Goodrich cord belt after this experience. It will carry millions of tons, from which will come steel for shiny new cars and thousands of other things.

B. F. Goodrich conveyor belts invariably save money for users because they're engineered for the special jobs to be done. Some kinds of belts stand hot materials, lasting far longer than others ever used to last. Some stand temperatures below zero. Some are made to handle wet, sticky or freezing materials without clogging pulleys. Some types are made especially for food products. Some are made to carry packages and other things up very steep inclines without letting them slide down. In fact, there's a B. F. Goodrich belt for almost every problem. Belts are made of many kinds of cords and fabrics, many different kinds of rubber compounds.

Call your B. F. Goodrich distributor for more information about any kind of belting, hose or other B. F. Goodrich rubber products. *The B. F. Goodrich Co., Dept. M-603, Akron 18, Ohio.*

**B.F.Goodrich**

**INDUSTRIAL PRODUCTS DIVISION**

# It's Allis-Chalmers . . .

**Motors, M-G Sets, Control, Switchgear... Dependable Allis-Chalmers Electrical Equipment Plays an Important Role in Steel Mill Expansion Programs**

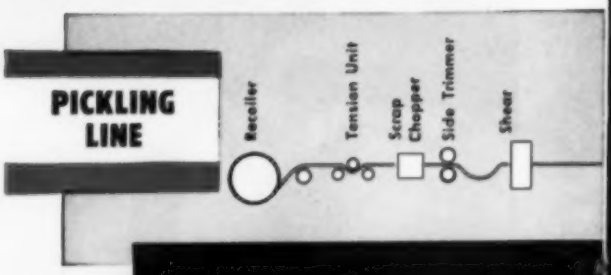
Demand for specialized steel remains at a record high. Steel producers are meeting the challenge with improvements on existing processing lines, or installation of new facilities for pickling and annealing operations.

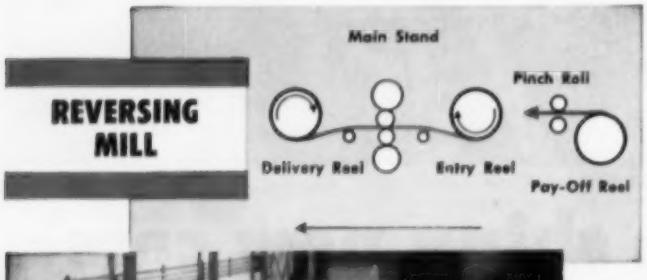
A recent installation of this type in an eastern steel mill featured Allis-Chalmers motors, m-g sets, control and operating stations, and switchgear throughout.

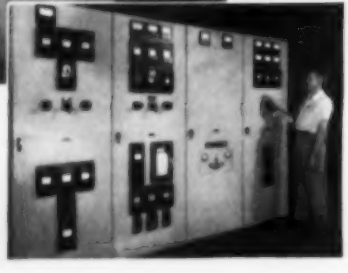
Allis-Chalmers equipment was chosen for this duty because of its record of quality, economy, durability . . . proven in years of heavy-duty steel mill operation.

Take advantage of Allis-Chalmers wide range of equipment and service. For help in planning new facilities or modernizing present plants, contact the A-C office in your district, or write Allis-Chalmers, Milwaukee 1, Wisconsin.

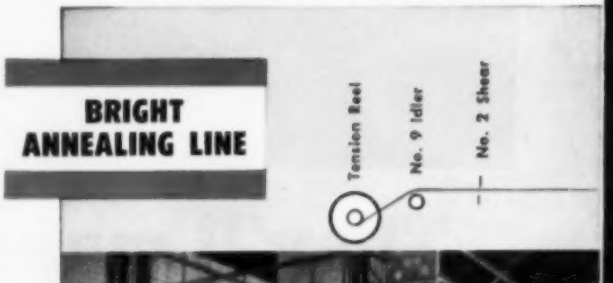
A-4872







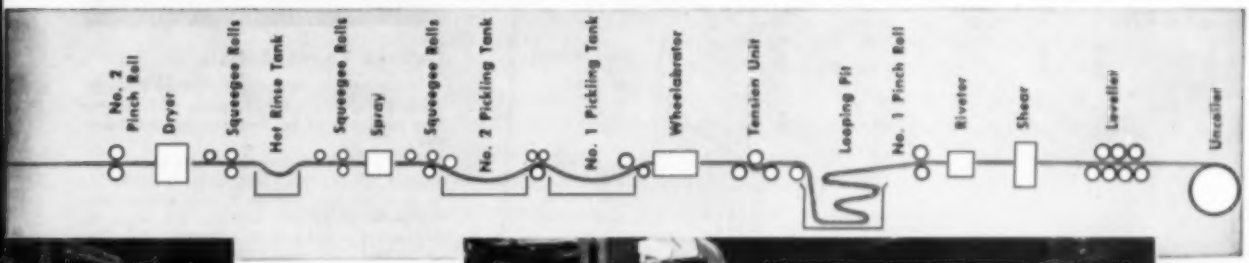
Overall view of new reversing mill motor room showing main motors, m-g sets, control, and 11,000/480-volt substation. Inset shows Allis-Chalmers 15-kv high voltage switching equipment for the motor-generator set and substation.

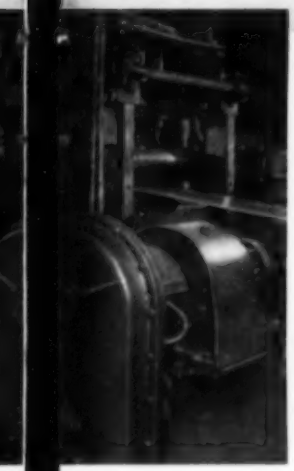


Delivery end of new annealing line. Allis-Chalmers desk-type operators' control stations, as shown here, are used throughout these modern new facilities.

**ALLIS-**

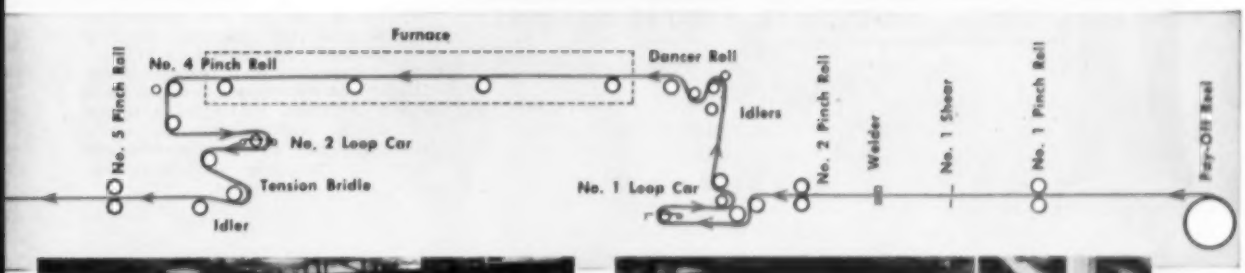
# . . . All Along the Line



Operator's station, entry end, 36-inch hot-rolled pickling line. Allis-Chalmers control, initiated from desk, gives positive, precision control of material speed.

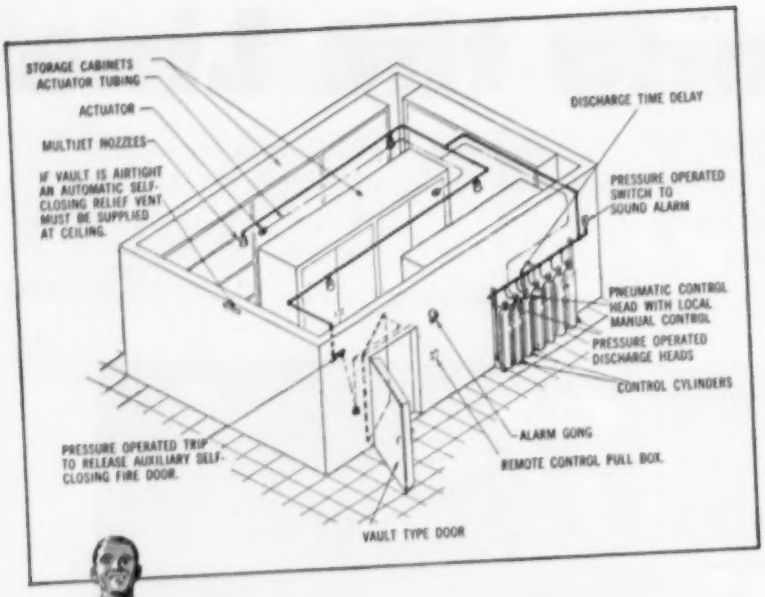
Allis-Chalmers dc control board and metering panels, m-g set, on delivery section of the pickling line.



Allis-Chalmers m-g set and dc control board on the annealing line. Allis-Chalmers m-g sets and controls are recognized in the steel industry for dependable, economical service.

Pinch roll drive on delivery end of annealing line. Allis-Chalmers fan-cooled motors drive various parts of the processing line.

**CHALMERS**


STORAGE CABINETS
ACTUATOR TUBING
ACTUATOR
MULTIJET NOZZLES
IF VAULT IS AIRTIGHT AN AUTOMATIC SELF-CLOSING RELIEF VENT MUST BE SUPPLIED AT CEILING.
DISCHARGE TIME DELAY
PRESSURE OPERATED SWITCH TO SOUND ALARM
PNEUMATIC CONTROL HEAD WITH LOCAL MANUAL CONTROL
PRESSURE OPERATED DISCHARGE HEADS
CONTROL CYLINDERS
ALARM GONG
REMOTE CONTROL PULL BOX.
PRESSURE OPERATED TRIP TO RELEASE AUXILIARY SELF-CLOSING FIRE DOOR.
VAULT TYPE DOOR

# GUARD VALUABLE RECORDS WITH THIS ENGINEERED FIRE PROTECTION!

Just let fire destroy one irreplaceable set of records — or original drawings—and your business stands a good chance of bankruptcy! And keep in mind that 44% of the firms whose doors are closed by fire *never* reopen for business again!

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With a Kidde system on the job, fire is out almost as soon as it starts. Kidde rate-of-temperature-rise detectors trigger the system at the first sign of a blaze, guarantee you round-the-clock protection even in case of outside power failure. Using safe, efficient carbon dioxide gas, Kidde systems snuff fire *without* a mess, will *not* damage records, papers or drawings!

Kidde systems have no falling weights, use no clumsy mechanical triggering methods. Pneumatic Control Heads insure instant and complete $CO_2$ discharge. All moving parts of a Kidde system are self-enclosed for safety, need no replacement after a fire, have easy-to-read indicators which show whether system is "set" or "released."

It's easy to get the best in fire protection — and it *can* mean the difference between profit and loss for you. For more information, write Kidde today.

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**Walter Kidde & Company of Canada, Ltd.**
**Montreal—Toronto**

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# LETTERS
## TO THE EDITORS

### College Lauds Article

We consider the article, "More College Recruiting?" (Jan. 23, page 40), to be one of the best on this subject we have read.

You told us some time ago that your supply of reprints had been exhausted, so now we are writing to ask permission to quote from the article. We wish to use it in a subject list to be given by us to the approximately 100 representatives of industrial and commercial firms recruiting on our campus each year.

Dr. E. Robert Chable
Director of Student Personnel
and Dean of Men
Hillsdale College
Hillsdale, Mich.

• *Permission granted.*

### Educational Mailing Job

I want to tell you how pleased we were to read the editorial, "Holding Your Market?" (Apr. 30, page 57).

Your comments and analysis of our industry and its research prompts us to request additional copies for a special "educational mailing job." We would like 100 copies so our directors and others can read your outstanding editorial.

James H. Cunningham
Director of Public Relations
National Coal Association
Washington

### Article To Help Sell Steel

Please forward six copies of the article, "New Vistas for Stainless" (Apr. 30, page 92). We have been trying to interest our engineering and manufacturing people in the 200-series steels, and we believe your article will help.

H. J. Zeck
Purchasing Agent
Pittsburgh Works
Allis-Chalmers Mfg. Co.
Pittsburgh

### Brainstorm Story Stimulates

As a Penton alumnus who participated in many editorial "brainstorming" sessions before the word was invented, I found the article, "Ideas for Industry" (Apr. 23, page 105), as nostalgic as a letter from home and as stimulating as an icy shower.

Ideas are the backbone of the editorial and public relations professions, and the conventional formal conference tends, as you say, to stifle ideas which have not been carefully thought out and which would expose the suggester to ridicule. Brainstorming is certainly the solution to this problem.

If three copies can be spared, I know

*(Please turn to page 12)*

# Feeling M-i-g-h-t-y Low?

**IF GRINDING WHEEL PROBLEMS HAVE YOU DOWN IN THE DUMPS, DON'T MONKEY AROUND.** Switch to CINCINNATI (PD)* WHEELS. For *now* CINCINNATI Grinding Wheels offer POSITIVE DUPLICATION—a remarkable achievement in precision manufacturing and quality control that *can save you money . . . and increase your production.*

You'll start every day with a big smile and a spring in your step when CINCINNATI (PD) WHEELS are on the job. For through the CINCINNATI (PD) Manufacturing Process you are assured Positive Duplication of the original wheel *every* time you reorder. "On grade" with a CINCINNATI (PD) WHEEL means all future (PD) WHEELS will act and grind exactly alike.

*Yet* CINCINNATI (PD) WHEELS *are priced no higher than ordinary wheels.*

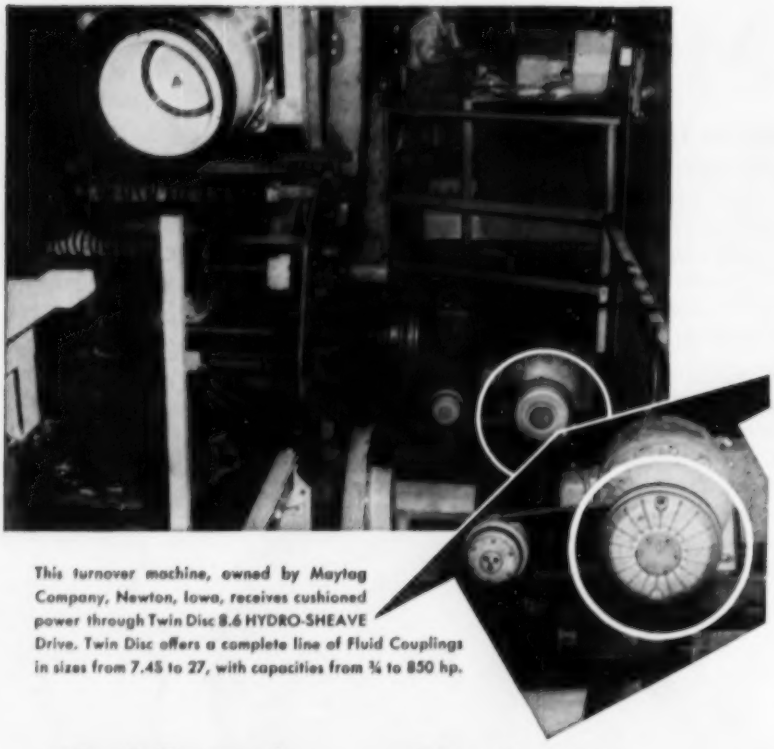
So, let us help you see the bright side of life once more. Just contact us and we'll send one of our representatives—men who know grinding and grinding machines as well as grinding wheels. Write, wire or telephone Sales Manager, Cincinnati Milling Products Division, The Cincinnati Milling Machine Co., Cincinnati 9, Ohio. Remember—*only* CINCINNATI Grinding Wheels give you . . .

(PD) POSITIVE DUPLICATION

CINCINNATI* *Grinding Wheels*

A PRODUCTION-PROVED PRODUCT OF THE CINCINNATI MILLING MACHINE CO.

*Trade Mark Reg. U. S. Pat. Off.



This turnover machine, owned by Maytag Company, Newton, Iowa, receives cushioned power through Twin Disc 8.6 HYDRO-SHEAVE Drive. Twin Disc offers a complete line of Fluid Couplings in sizes from 7.45 to 27, with capacities from ¼ to 850 hp.

# Fluid Drive eliminates MOTOR BURN-OUTS

The Maytag Company, one of the nation's leading home laundry equipment manufacturers, recently had the *annoying and expensive* problem of frequent motor burn-outs on a turnover machine in the assembly-line manufacture of washing machines.

Because of a large number of reversals per hour, the 5 hp, 1750 rpm motor could not cycle fast enough to keep pace with stepped-up conveyor lines. To solve this problem, a Twin Disc 8.6 HYDRO-SHEAVE® Drive was installed on the motor.

Now, automatic fluid "slip" *absorbs* the shocks and overloads—and there have been *no* motor burn-outs. The fluid drive also eliminated the need for an extra friction brake. In addition, the HYDRO-SHEAVE has permitted conversion from flat belts to V-belts—making faster cycling possible. And the reversing operation is more than able to keep up with the conveyor lines.

The Twin Disc HYDRO-SHEAVE provides *cushioned* drive—with a *smooth, steady* flow of power. And it smooths *out* shock loads — protecting *both* driving and driven equipment. For complete information, write Twin Disc, Dept. DS, Racine, Wisconsin, *today*. Request *new* HYDRO-SHEAVE Bulletin 145-C.

TWIN DISC

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Fluid Couplings

TWIN DISC CLUTCH COMPANY, Racine, Wisconsin • HYDRAULIC DIVISION Rockford

Branches or Sales Engineering Offices: Cleveland • Dallas • Detroit • Los Angeles • Newark • New Orleans • Tulsa


# LETTERS

*(Concluded from page 10)*

where to find some eager practitioners for the technique.

Adding my voice to the many others you have heard, may I congratulate you heartily on the entire Program for Management series.

Howard C. Tuttle
Public Relations Assistant
Tractor & Implement Division
Ford Motor Co.
Birmingham, Mich.

## Pertinent to Platers

The article, "Plating Pit-Free, Heavy Nickel" (Jan. 30, page 98), is informative and pertinent to our work. We would like a few copies to pass on to our plating room.

Bert B. Rozene
Chief Chemist
Chemical Laboratory
Boston Naval Shipyard
Boston

## Staff Finds Report "Meaty"

Please forward three copies of the article, "Tips for Better Weldments" (Apr. 23, page 132). Our engineers consider it concise and meaty. Congratulations!

Phillip L. Sommer
Time Study Supervisor
LeTourneau-Westinghouse Co.
Subsidiary of Westinghouse Air Brake Co.
Peoria, Ill.

## Engineers To Reprint Story

May we have permission to reprint the article, "Unrest Among Engineers" (Dec. 26, page 29), in our publication, *The San Diego Engineer*? We are sure our subscribers would enjoy reading it.

L. P. Desmond
Business Manager
San Diego Chapter
Engineers & Architects Association
San Diego, Calif.

• *Permission granted.*

## Fantastic Welding Speed?

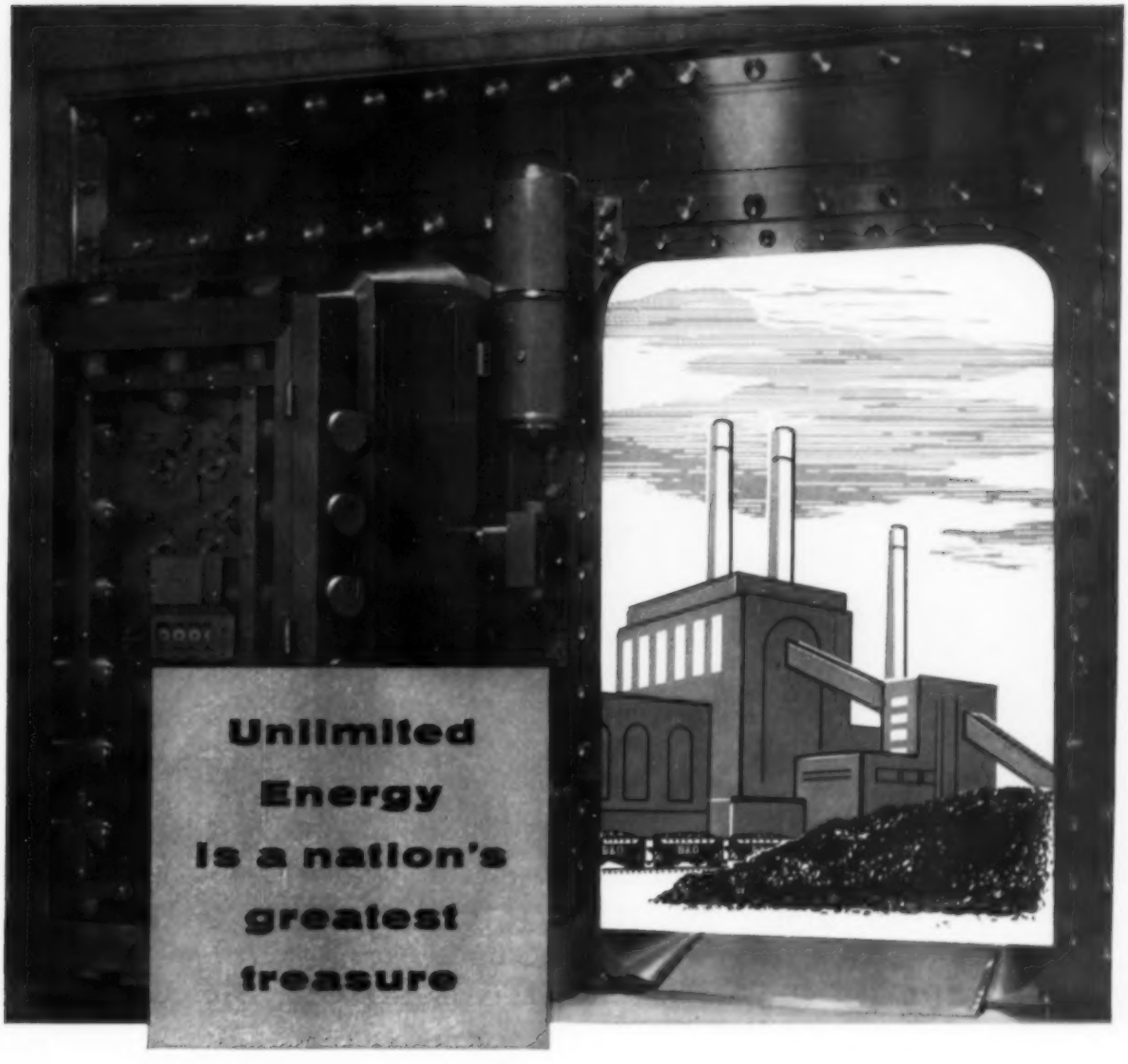
The article, "Make-Your-Own Automatic Welder" (Mar. 19, page 120), has a picture showing an automatic welding machine at work. The caption mentions automatic welding speeds of 216 in. per minute.

I'd like to know more about this speed. It sounds fantastic and incredible at this time.

Merrill F. Yale
District Manager
Lincoln Electric Co.
Denver

• *The Alliance Machine Co. reports that the weld machine pictured does have a maximum speed of 216 in. a minute, but that the girder in the photo is being welded slower due to its size.*

*There is commercial automatic equipment today that will weld light gage metals at speeds up to 200 in. a minute.*

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*John Evans' Sons, Inc.*

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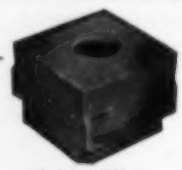

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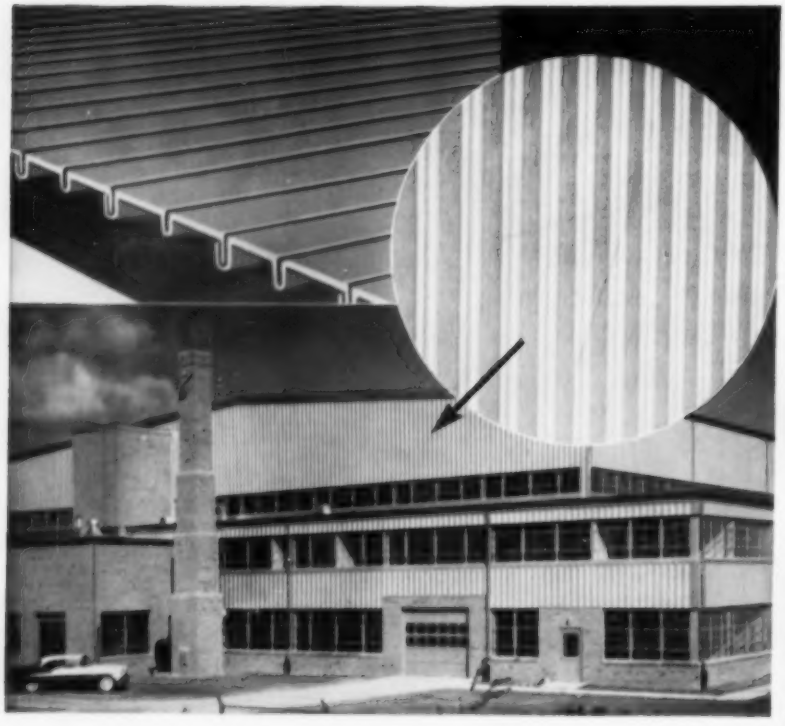

(TOP) *Cross-section of cold-roll-formed Roof Deck by Walker Supply & Mfg. Co., Ecorse, Michigan.*

(INSET CIRCLE) *Aluminum siding panels, (made by Walker Supply & Mfg. Co.) give fine architectural effect.*

*Elevator Door, Casing and Trim, by Dahlstrom Metallic Door Co., Jamestown, N. Y.*

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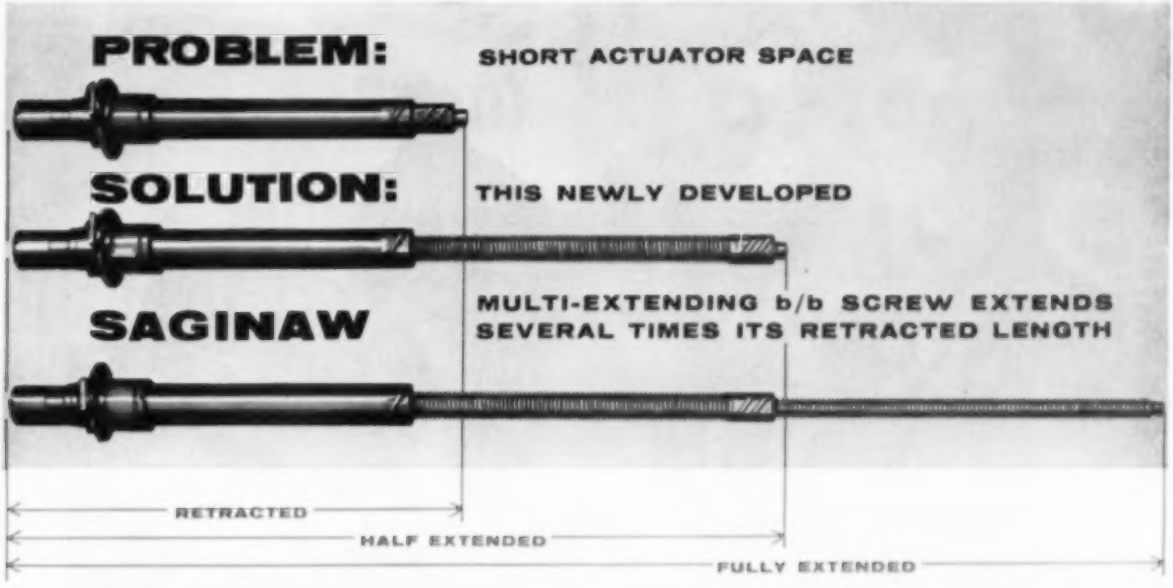


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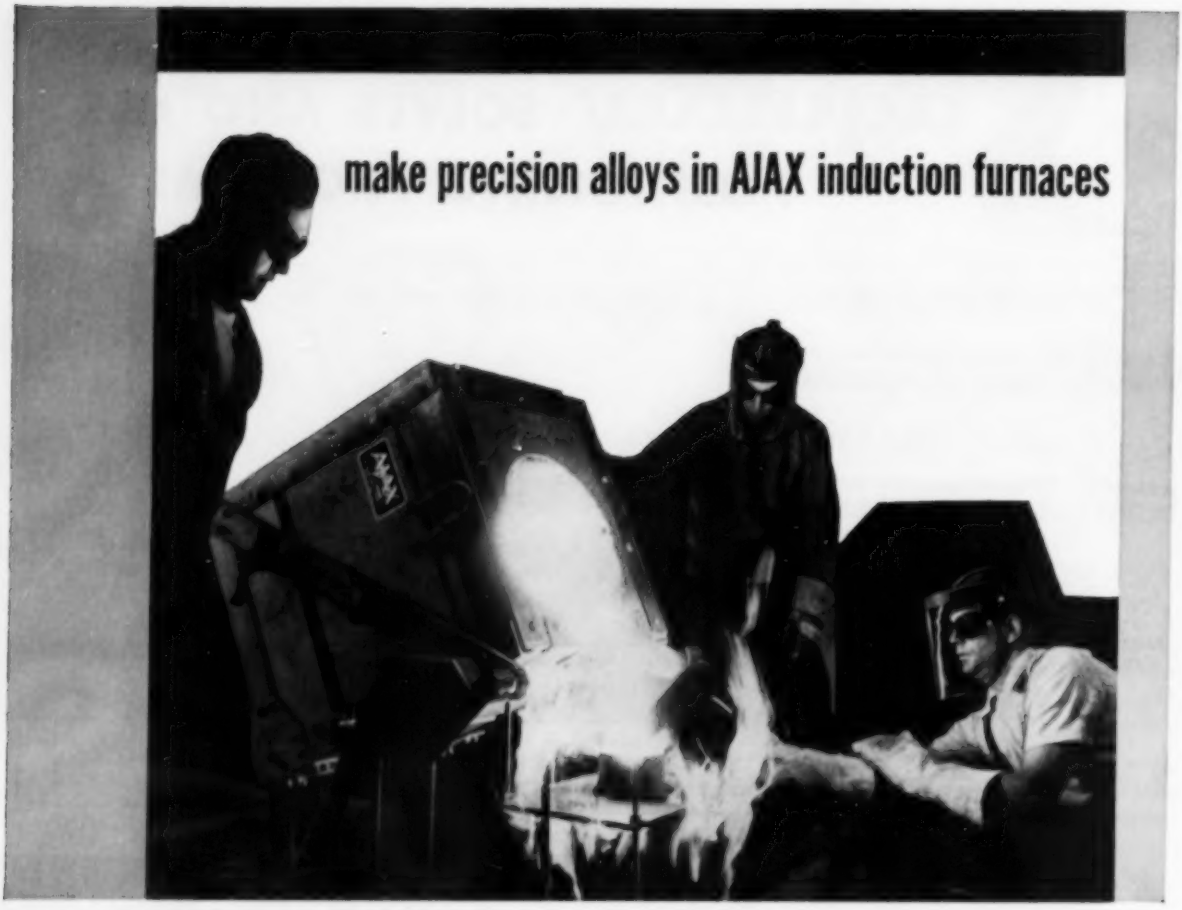


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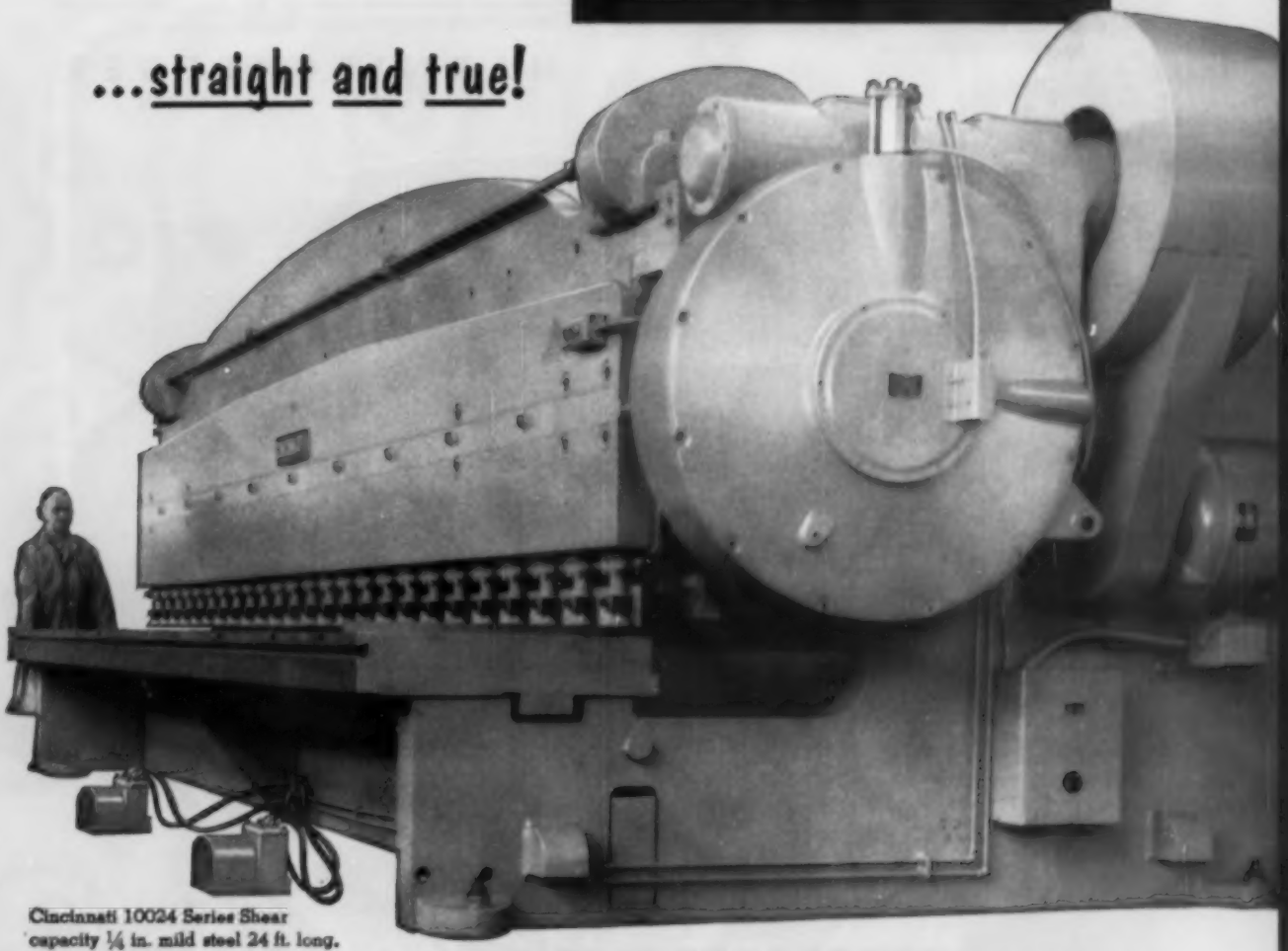

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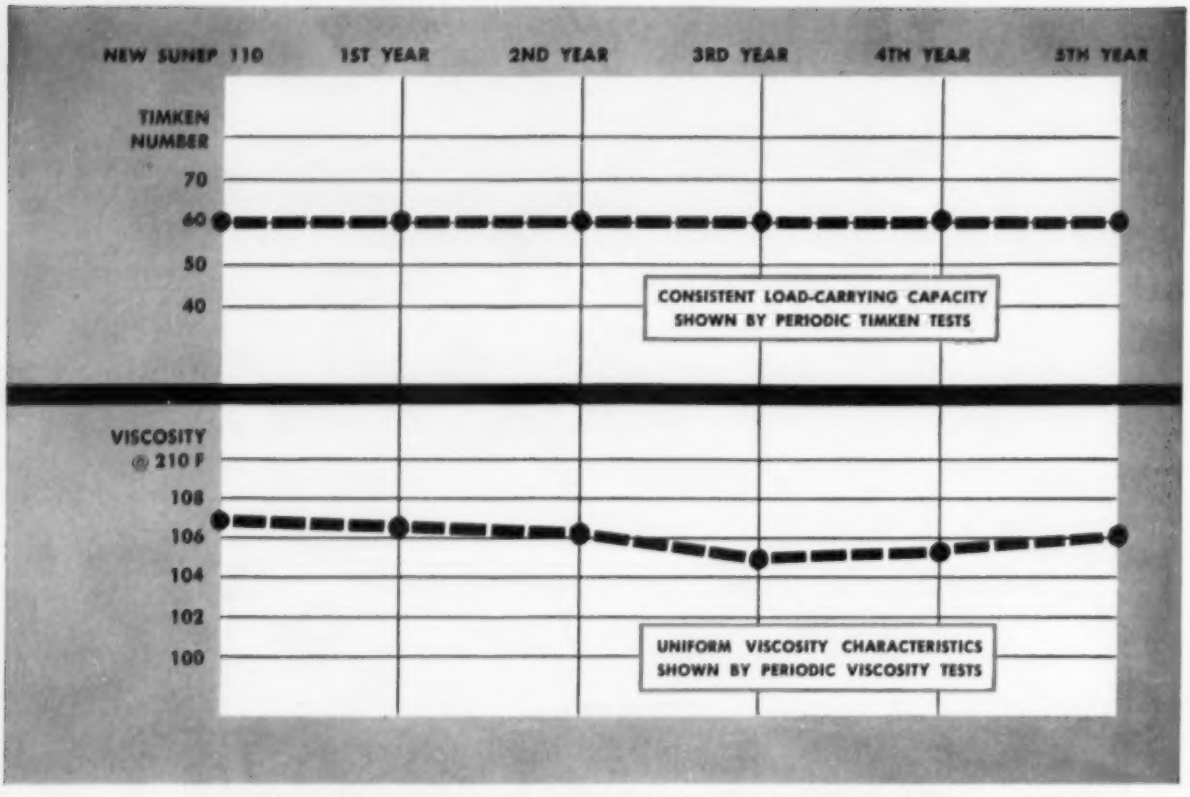


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*Steel company tests show:*

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**For complete information** about Sunep lubricants see your Sun representative, or write for free Technical Bulletin 32. Address SUN OIL COMPANY, Philadelphia 3, Pa., Dept. S-5.

SUNOCO

**INDUSTRIAL PRODUCTS DEPARTMENT**

**SUN OIL COMPANY** Philadelphia 3, Pa.

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# CALENDAR
## OF MEETINGS

**May 21-23, Triple Industrial Supply Convention:** Traymore hotel and Chalfonte-Haddon Hall, Atlantic City, N. J. Information: W. B. Thomas, Hunter-Thomas Associates, 2130 Keith Bldg., Cleveland 15, O.

**May 23-24, American Iron & Steel Institute:** Annual meeting, Waldorf-Astoria, New York. Institute's address: 350 Fifth Ave., New York 1, N. Y. Secretary: George S. Rose.

**May 23-24, American Management Association:** General management conference, Hotel Roosevelt, New York. Association's address: 1515 Broadway, New York 36, N. Y. Vice president-secretary: James O. Rice.

**May 28-30, Wire Reinforcement Institute Inc.:** Annual meeting, Greenbrier, White Sulphur Springs, W. Va. Institute's address: 1049 National Press Bldg., Washington 4, D. C. Managing director: Frank B. Brown.

**May 28-31, National Fluid Power Association:** Annual meeting, Greenbrier, White Sulphur Springs, W. Va. Association's address: 1618 Orrington Ave., Evanston, Ill. Secretary: Barrett Rogers.

**May 28-June 2, Concrete Reinforcing Steel Institute:** Annual meeting, Greenbrier, White Sulphur Springs, W. Va. Institute's address: 38 S. Dearborn St., Chicago 3, Ill. Managing director: H. C. Delzell.

**May 29-30, Steel Joist Institute:** Annual meeting, Greenbrier, White Sulphur Springs, W. Va. Institute's address: DuPont Circle Bldg., Washington 6, D. C. Managing director: C. H. Luedeman.

**June 1-3, Steel Kitchen Cabinet Manufacturers Association:** Annual meeting, Greenbrier, White Sulphur Springs, W. Va. Association's address: 1008 Engineers Bldg., Cleveland 14, O. Secretary: Arthur J. Tuscany Jr.

**June 3-6, Automotive Engine Rebuilders Association:** Annual meeting, Sherman hotel, Chicago. Association's address: 419 N. Capitol Ave., Indianapolis 4, Ind. Executive vice president: R. G. Patterson.

**June 3-6, American Gear Manufacturers Association:** Annual meeting, Homestead, Hot Springs, Va. Association's address: One Thomas Circle, Washington 5, D. C. Executive secretary: John C. Sears.

**June 3-8, Society of Automotive Engineers Inc.:** Summer meeting, Chalfonte-Haddon Hall, Atlantic City, N. J. Society's address: 29 W. 39th St., New York 18, N. Y. Secretary: John A. C. Warner.

**June 4-7, National District Heating Association:** Annual meeting, Inn and Lodge, Williamsburg, Va. Association's address: 827 N. Euclid Ave., Pittsburgh 6, Pa. Secretary-treasurer: John F. Collins Jr.

**June 5-8, Material Handling Institute Inc.:** Material handling exposition, Public Auditorium, Cleveland. Institute's address: One Gateway Center, Pittsburgh 22, Pa. Managing director: R. Kennedy Hanson.

**June 6-8, American Society for Quality Control:** Annual meeting, Mt. Royal hotel, Montreal, Que. Society's address: 50 Church St., New York 7, N. Y. Secretary: C. E. Fisher.

**June 7-8, Society for Advancement of Management:** National small business conference, Hotel Statler, New York. Society's address: 74 Fifth Ave., New York 11, N. Y. Executive vice president: Harold L. Bixler.

**June 7-8, Machinery & Allied Products Institute:** Annual meeting, Hotel Statler, Washington. Institute's address: 1200 18th St. N.W., Washington 6, D. C. Secretary: Charles I. Derr.

**June 7-9, Electric Metal Makers Guild Inc.:** Annual meeting, Onesta hotel, Canton, O. Guild's address: Box 6026, Mt. Washington Station (11), Pittsburgh, Pa. Secretary: A. C. Ogan.

**June 7-10, National Metal Trades Association:** Western plant management conference, Dell View hotel, Lake Delton, Wis. Association's address: 122 S. Michigan Ave., Chicago 3, Ill. Secretary: Charles L. Blatchford.

**June 11-12, Malleable Founders' Society:** Annual meeting, Homestead, Hot Springs, Va. Society's address: 1800 Union Commerce Bldg., Cleveland 14, O. Secretary: Lowell D. Ryan.


**ALUMINUM FINISHES**

THE FINISHING TOUCH

by A. B. HOEFER
*vice president*
FREDERIC B. STEVENS, INC.

*Will Anodized Aluminum Replace Nickel-Chrome Finishes?*

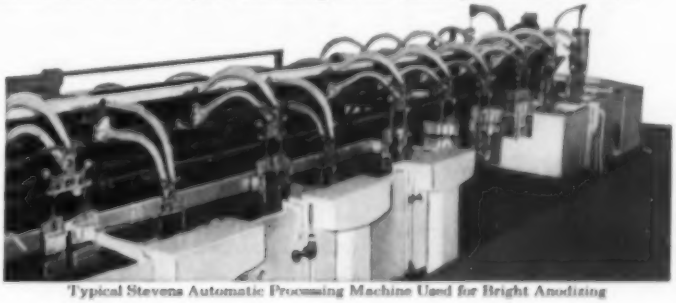
Affirmative answers to this question are revealed in several current business publications and our own sales figures.

Speeding the change is the continued tight supply of nickel. Manufacturers have been forced to look for substitutes for nickel and like the results anodized aluminum have given them.

*A trend is developing.* Volume of Stevens Automatic anodizing equipment sold in 1955 was nearly double the volume for the two preceding years. At the same time, sales of Stevens compositions used in buffing and polishing aluminum were showing a 50% increase.

Frederic B. Stevens, Inc., manufacture equipment for both nickel-chrome and aluminum finishes. We believe both types of finishes will increase in demand but at the moment the interest in aluminum is high.

If you are considering aluminum for your product, you can be assured that aluminum parts can be bright anodized and finished to compare favorably with the fine finish of chrome plate. In addition, aluminum can be dyed, resulting in non-fading colored finishes.



Typical Stevens Automatic Processing Machine Used for Bright Anodizing

Stevens aluminum anodizing equipment is presently being used and recommended in the finishing of colored anodized tumblers, utensils, refrigerator componenta, rivets, automotive trim, lighting reflectors, etc.

Stevens' experience in furnishing complete anodizing equipment installations assures you of the latest techniques—the finest finishes—at the lowest costs.

For long range planning consider the versatility of Stevens Automatic equipment. Changes of cycles or processes can be accomplished quickly and inexpensively. Your Stevens Automatic Processing Machine for anodizing can be changed to a nickel-chrome cycle at a later date.

If your design engineers are talking of aluminum to add sales appeal excitement, cost reducing features to your new product lines, let us discuss your requirements with you.

***For further information write to Frederic B. Stevens, Inc., Detroit 16, Michigan.***

FREDERIC B. STEVENS
INCORPORATED
YOUR METAL FINISHING SUPERMARKET
DETROIT 16, MICHIGAN

METAL FINISHING EQUIPMENT AND SUPPLIES FROM CASTINGS OR STAMPINGS TO FINISHED PRODUCT

BRANCHES:
Buffalo • Cleveland • Indianapolis • New Haven

# For your new factory ... or addition

# Which locking system do you prefer?

## Republic Steel Lockers offer three types

Combination . . . padlock . . . or key operated . . . Republic has 'em all—including Key-Control.

And you can have your choice of these protective systems in any one of many types and sizes of standard steel lockers for every conceivable storage requirement.

Through more than 65 years, Republic's Berger® Division, the world's biggest manufacturer of lockers, has completed more installations than any other maker. Here is experience you can always depend on when you want the best in lockers.

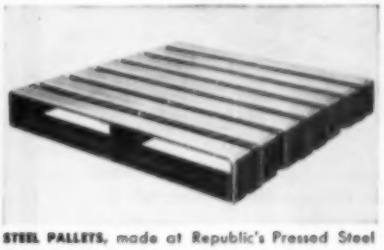
Berger offers business and industry a complete planning and installation service, too. A service which supplies technical planning and engineering assistance, then assumes full responsibility for proper installation—right down to the final bolt. Get all the facts from your Berger representative, or send coupon for booklet giving details, specifications and prices.

# REPUBLIC

*World's Widest Range of Standard Steels*

## These Republic products can be an important part of your operation

**PALLET RACKS** permit convenient storage of bulky, irregular materials that are normally unstackable. Odd lots are stored with space-saving economy. Simply palletize them all, and load pallets on rack. The rack, not the load, bears all the weight. Two-way entry permits loading and unloading from either side. Republic Pallet Racks, shipped knocked down, are easy to assemble. Sizes are available to fit your standard pallets.



**STEEL PALLETS**, made at Republic's Pressed Steel Division, are designed to eliminate the nuisance and expense of repairing broken deck boards, protruding nails, split stringers and joint failures. They're strong, rigid, have no sharp edges or projections to damage containers or workmen. Republic Engineers will help you develop a design that meets your specific requirements. Send coupon for literature.

**WEDGE-LOCK STEEL SHELVING**, the world's strongest, is designed to gain strength as the load increases, thus permitting higher stacking without distortion or instability. Another product of Republic's Berger Division, Republic Wedge-Lock permits efficient use of overhead space. Wedge-Lock is easy to assemble; and later rearrange to suit changing needs. Mail coupon below for additional information on complete shelving line.

# STEEL

*and Steel Products*

**REPUBLIC STEEL CORPORATION**
**Dept. C-1798**
**3120 East 45th Street**
**Cleveland 27, Ohio**

Please send me additional information on:

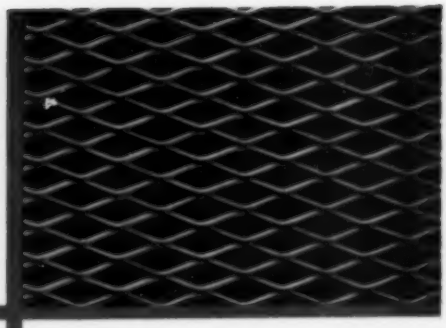
☐ Lockers ☐ Pallets
☐ Shelving ☐ Pallet Racks

Name_____

Address_____

City_____ Zone____ State_____

# Handsome, functional MINIMESH makes good products better



Minimesh grille protects speaker, transmits sound, adds beauty in new coin-operated phonograph by J. P. Seeburg Corp., Chicago.

Because it combines beauty and utility — at low cost, Penmetal Minimesh is widely used for decorative purposes and for guards or grilles on stoves, heaters, radios, phonographs, etc. Three famous products, which have been improved with Minimesh, are shown.

Minimesh is small mesh ($^3/_{16}$") expanded metal, and like the larger meshes, is sheet metal which has been slit and expanded up to five times its original width. 80% lighter than solid sheet of the same dimensions, the diamond truss pattern adds rigidity and strength.

The openings in Minimesh permit passage of light, heat, air and sound. Comes in standard or flattened form. Can be cut, shaped or welded to suit design requirements.

Put Minimesh to work for you. Write for new catalog 510-EM, which gives sizes, weights and dimensions.

**PENN METAL COMPANY, INC.**
*General Sales Office:* 205 East 42nd Street
New York 17, N. Y.
*Plant:* Parkersburg, W. Va.
*District Sales Offices:* Boston, New York, Philadelphia, Pittsburgh, Chicago, Detroit, St. Louis, Dallas, Little Rock, Seattle, San Francisco, Los Angeles, Parkersburg

**ABOVE** — Zenith Radio Corp., Chicago, incorporates extensive Minimesh grillework in this radio set.

**RIGHT** — Gas heater by Temco, Inc., Nashville, Tenn. — one in a famous line recently redesigned with Minimesh to bring modern styling to the gas heating field. Open mesh grilles deliver heat.

Penmetal
1869

PM-100

# Pangborn Rotoblast® Cuts Cleaning Costs $250 a Day for General Foundries!

General Foundries, Milwaukee, Wis., replaced its old cleaning equipment with a Pangborn Rotoblast Table-Room and a Blastmaster Barrel, reducing labor costs and eliminating casting breakage to the tune of $250 a day!

Some foundrymen tell us they're most impressed with Pangborn Rotoblast's speed of cleaning, its high production rate. Others praise the quality of its work . . . the manpower reduction due to its automatic operation. But whatever the reasons—cleaning quality, speed, lower labor and maintenance costs, no abrasive loss—they all add up to the fact that Pangborn Rotoblast gives you *lower cost per ton of castings cleaned.* And, in the final analysis, this figure determines the efficiency of your blast cleaning operation.

Investigate Pangborn Rotoblast and discover which machine can best streamline your operating costs! Write for Bulletin 227 to PANGBORN CORPORATION, 1600 Pangborn Blvd., Hagerstown, Maryland. *Manufacturers of Blast Cleaning and Dust Control Equipment.*

## And $1,500 a month for Specialty Aluminum and Bronze!

At Specialty Aluminum and Bronze Corp., Revere, Mass., the Pangborn Blastmaster Barrel reveals any casting imperfection as soon as blasted. This saves further processing costs. This and other savings total $1,500 a month for the firm!

# Pangborn

## BLAST CLEANS CHEAPER

Rotoblast Blastmaster® & Continuous-Flo Barrel

Rotoblast® Tables & Table-Rooms

Special Blast Rooms & Cabinets

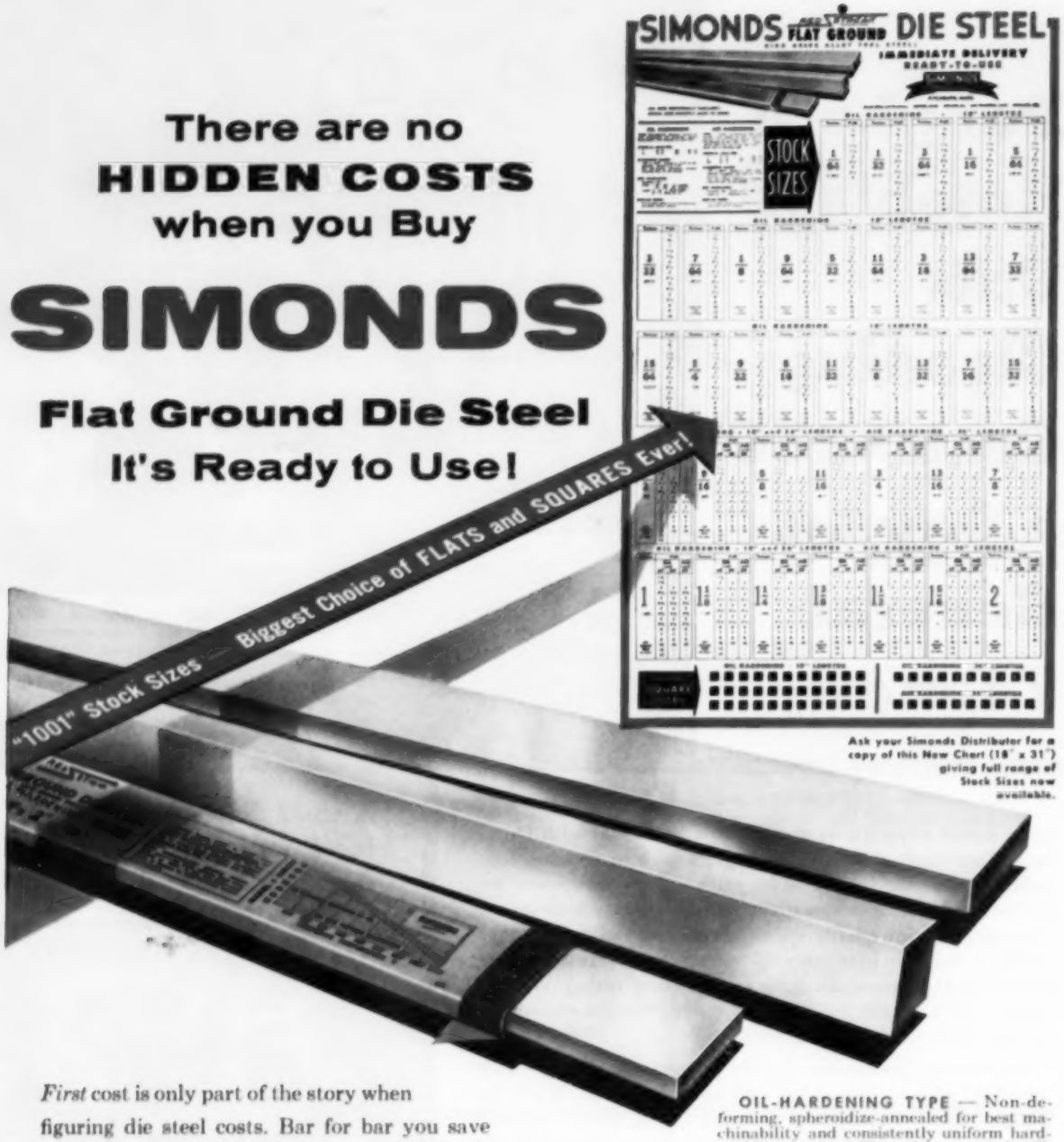
Pangborn Dust Control Equipment

*Distributors for Malleabrasive and Tru-Steel Abrasives*

There are no
**HIDDEN COSTS**
when you Buy

# SIMONDS

## Flat Ground Die Steel
## It's Ready to Use!


SIMONDS FLAT GROUND DIE STEEL
IMMEDIATE DELIVERY
READY-TO-USE
STOCK SIZES
"1001" Stock Sizes — Biggest Choice of FLATS and SQUARES Ever!

Ask your Simonds Distributor for a copy of this New Chart (18" x 31") giving full range of Stock Sizes now available.

*First* cost is only part of the story when figuring die steel costs. Bar for bar you save with Simonds. Simonds Flat Ground Die Steel requires no costly grinding to size. It's *already* precision ground to 1001 stock sizes. What's more it's uniformly annealed and readily machinable. You save on time. You get better results . . . have a choice of OIL Hardening or AIR Hardening type.

**OIL-HARDENING TYPE** — Non-deforming, spheroidize-annealed for best machinability and consistently uniform hardenability — from Simonds' own steel mill. Extra-smooth finish with all decarburization and surface defects removed. Wide hardening range. Individually packaged (18" and 36" lengths) with simplified heat treating instructions.

**AIR-HARDENING TYPE** — Non-deforming, spheroidize-annealed, 5% chrome — more wear-resistant yet easy to machine and heat treat with uniformly excellent results. Another product of Simonds' steel mill. Extra-smooth finish with all decarburization and surface defects removed. Wide hardening range. 36" lengths: Individually packaged with heat treating instructions.

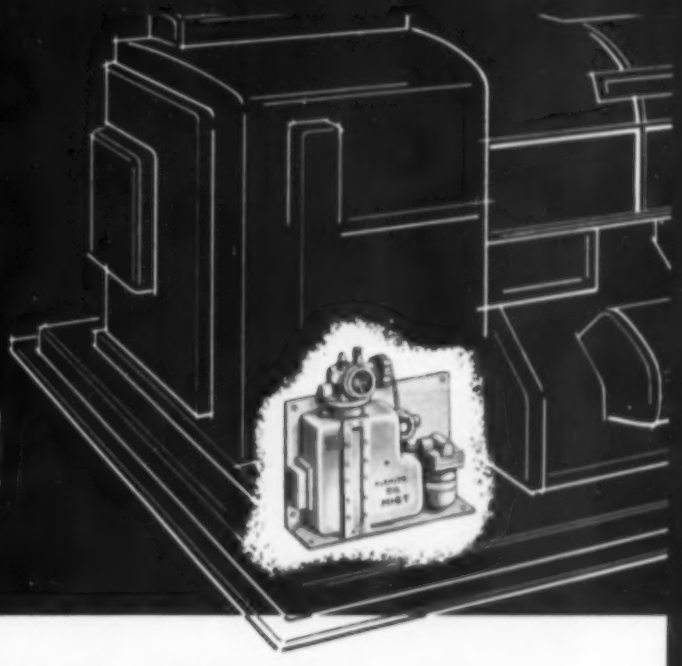
**SIMONDS**
**SAW AND STEEL CO.**
FITCHBURG, MASS.

For Fast Service from Complete Stocks

Call your
**SIMONDS Industrial Supply DISTRIBUTOR**

Factory Branches in Boston, Chicago, San Francisco and Portland, Oregon, Canadian Factory in Montreal, Que., Simonds Divisions: Simonds Steel Mill, Lockport, N. Y., Heller Tool Co., Newcomerstown, Ohio, Simonds Abrasive Co., Phila., Pa., and Arvida, Que., Canada

# save up to 90% on lubricating costs!



# ALEMITE OIL-MIST AUTOMATIC LUBRICATION

## multiplies bearing life...cuts product spoilage ...boosts machine output in almost every industry!

Alemite Oil-Mist Automatic Lubrication brings remarkable savings . . . in lubricants, man-hours, bearing life, and decreased product spoilage.

Alemite Oil-Mist *atomizes* oil into mist – distributes it through tubing to bearings – bathes all bearing surfaces with a cool film of clean oil. Maintains uniform oil film on plain and anti-friction bearings, gears and chains – despite variations in load, temperature or speed. Amazingly simple, continuous and fully automatic . . . Alemite Oil-Mist eliminates the waste and uncertainties of the "human element" in lubrication.

Let us show you how Alemite Oil-Mist provides more efficient, foolproof lubrication, at lower cost! Mail coupon below for a graphic demonstration!

## 8 ADVANTAGES of the ALEMITE OIL-MIST System

**1. Continuous Lubrication** – Constantly deposits fresh, clean film of oil on all surfaces of all bearings in the system.

**2. Fully Automatic Lubrication** – Can start and stop with operation of machine switch.

**3. Elimination of Guesswork** – No bearing can be over-looked, nor over-lubricated! Every bearing picks up only as much Oil-Mist as it needs.

**4. Reduction of Bearing Temperatures** – Acts as bearing coolant, can lower bearing temperatures as much as 20° F.

**5. Reduction of Types of Oil** – Reduces number of oils that must be stocked, handled, and applied.

**6. Elimination of Downtime** – All bearings in the system are constantly lubricated while machines continue to operate.

**7. Extension of Bearing Life** – Multiplies bearing life many times. Life of grinding machine bearings has been extended from 400 to 7,000 hours!

**8. As High As 90% Less Oil Consumption** – Alemite Oil-Mist usually consumes about $^1/_{10}$ the amount consumed by any other oiling method!

**Alemite Oil-Mist Lubricates ALL Types of Mechanisms**

Anti-friction Bearings | Plain Bearings | Chain | Gear | Gear Cases

A PRODUCT OF SW STEWART-WARNER

# ALEMITE

REG. U. S. PAT. OFF.

**A Product of STEWART-WARNER CORPORATION**

**Alemite Division of Stewart-Warner, Dept. BB-56**
**1850 Diversey Parkway, Chicago 14, Illinois**

☐ Please send me a FREE copy of your new and complete Oil-Mist catalog.

☐ Please have your Alemite Lubrication Representative arrange a no-obligation demonstration.

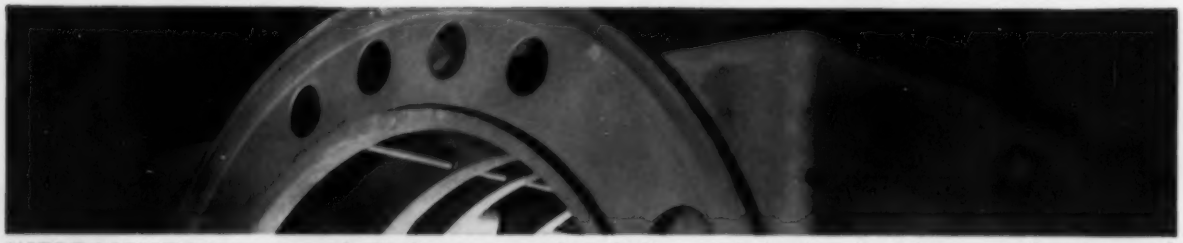
My Name _____

Title _____

Company _____

Street _____

City _____ State _____



**WELDMENTS for strength, lightness, predictability and design freedom — at lower cost!**

**ELECTRICAL GENERATOR FRAME:** End section of a three-piece stator frame built by Lukenweld for General Electric. This type of welded structure provides remarkable rigidity and strength at critical points with a minimum of weight.

# *LUKENWELD QUALITY WELDMENTS OFFER YOU A UNIQUE COMBINATION OF ADVANTAGES*

Lukenweld welcomes orders for the really big and challenging weldments. The most extensive facilities and longest experience of any commercial weldery in the country combine to save you money and time. Here's how...

**DEPENDABILITY** The predictability and rigidity of welded structures plus Lukenweld's specialized knowledge of design and materials selection assures equipment that will perform efficiently, longer.

**RELIABLE SOURCE OF MATERIALS** Carbon, alloy and clad steel plates in the widest range of types and sizes available anywhere are obtainable "right next door"—from the Lukens rolling mills.

**CONSULTATION SERVICE** Metallurgical, design engineering, related services are available on your job.

**FINISHING FACILITIES** Modern heat treating, machining and other finishing facilities are your assurance of complete quality control from steel plate to finished weldment—ready for assembly in your equipment.

**EXPERIENCE** Lukenweld, the first commercial weldery in the U.S., pioneered many advances in welded construction. Knowledge and craftsmanship gained through this experience make Lukenweld unusually qualified to meet your weldment needs.

**FOR INFORMATION** on how Lukenweld can answer your particular weldment problems or for a copy of the informative booklet, "Weldments by Lukenweld," write on your company letterhead to Manager, Marketing Service, 819 Lukens Building, Coatesville, Pa.

**LUKENWELD** LUKENS

A DIVISION OF LUKENS STEEL COMPANY
COATESVILLE, PENNSYLVANIA

## "The right quench oil for our work is

# SHELL VOLUTA OIL 23"

says Garland Wilcox, Chief Metallurgist
Wallace Barnes Co., Bristol, Conn.

## ...the story of a profitable change

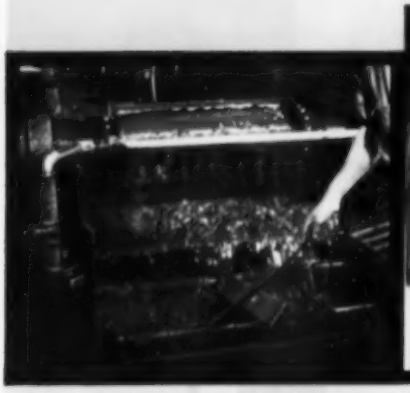
WALLACE BARNES COMPANY and steel springs have "gone together" for nearly a century. Most of today's output is in SAE 1075 or 1095 steel.

Because the quenching operation is so important to the life of springs, the Wallace Barnes laboratory decided to test its regular quenching oil against some of the newer products, including Shell Voluta Oil 23. This is what they found:

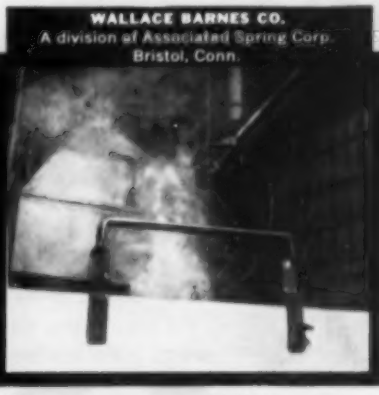
Shell Voluta Oil 23 showed a superior quench rate, with correct hardening and relative freedom from distortion. It drained more rapidly from the quenched parts, reducing dragout loss. It washed off more completely in the alkaline cleaner; it reduced flaming, and cut down on the oil baked to parts.

Wallace Barnes reports that this oil has almost eliminated trouble with "slack-quenched parts," and that heavier stock now goes through without special handling. So . . . Shell Voluta Oil 23 has replaced the former quench oil in all tanks of the spring hardening departments, serving salt pot lines and shaker hearth furnaces.

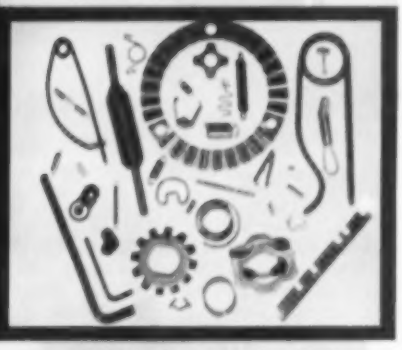
We'll be glad to provide full information on Shell Voluta Oil 23.



Shaker hearth furnaces automatically dump parts into Shell Voluta Oil 23, then remove and drain them.




Flat springs at austenitizing temperature get a fast quench in Shell Voluta Oil 23.



Over 35,000 prints of production items like these are kept on file at Wallace Barnes Co.

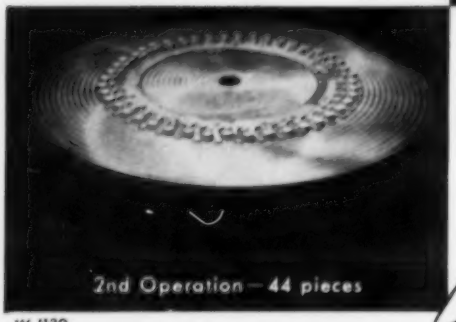
**SHELL OIL COMPANY**

50 WEST 50TH STREET, NEW YORK 20, NEW YORK
100 BUSH STREET, SAN FRANCISCO 6, CALIFORNIA

SHELL

# Another example

W-1138




W-1139

# of Blanchard versatility

No. 303 Stainless Steel Forging

## 653 oddly shaped, non-magnetic workpieces

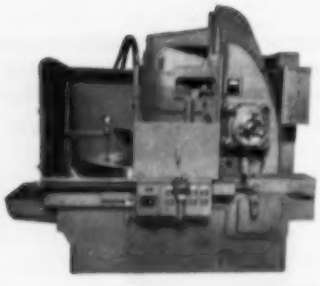
Blanchard Surface Grinders are noted for their unusual versatility—like grinding small, non-magnetic stainless steel forgings in quantity.

In the first operation, 653 forgings are loaded and blocked between rings on a No. 18 Blanchard, with 36" magnetic chuck (stock removal .010"). Parts, chuck and rings are sprayed with oil, and molten sulphur is poured around the parts to hold them. After grinding, the sulphur is easily stripped away.

This entire operation takes only 1½ hours—including preparation of the sulphur.

In the second operation, 44 pieces are set in a notched steel ring. Tilting the wheelhead and maintaining wheel pressure in one direction holds these non-magnetic pieces in the notches. Stock removal from this surface is .030", to tolerance of ±.003. Each load takes eight minutes—floor-to-floor.

As a result of this ingenious workholding, each piece is ground on both sides in a fraction of a minute, at less than 98¢ abrasive cost for all 653! That's typical of the convenience and economy of grinding on a Blanchard—whether the parts are magnetic or non-magnetic!



*Send for free copies of "Work Done on the Blanchard", 4th edition, and "The Art of Blanchard Surface Grinding", 3rd edition—recently revised.*

**PUT IT ON THE BLANCHARD**

**THE BLANCHARD MACHINE COMPANY** 64 STATE ST., CAMBRIDGE 39, MASS., U.S.A.

PHOTOGRAPHED AT DETROIT PRODUCTIVE PARTS, CLAWSON, MICH.

You get right to the meat of your centerless grinding problem when you specify wheels by CARBORUNDUM. Each is designed and built with the *one* combination of abrasive grain and bond to perform your specific job best. Regulating wheels, too, are job-engineered at CARBORUNDUM.

For instance, a special resilient-center regulating wheel, developed for armature grinding and similar work, eliminates the grinding pressures and faulty finish created by conventional feed wheels. *You* can benefit from this outstanding leadership in centerless grinding.

Call in your CARBORUNDUM Distributor or salesman today—to survey your operations and recommend the wheels you need. Or write The Carborundum Company, Niagara Falls, New York. In Canada: Canadian Carborundum Company, Ltd., Niagara Falls, Ontario.

**Through application "know-how" and product quality**

# CARBORUNDUM

REGISTERED TRADE MARK

**continually puts more sense in your abrasive dollar**

Cleveland-Cliffs back in 1911 formalized its program, on which it had been working for many years, by organizing a Safety Department and creating the position of Director of Safety. It was the first to do so. Standards of safety rules and safe practices were formulated and published and placed in the hands of every employee.

**LAKE SUPERIOR IRON ORE • FERRO ALLOYS**
**VESSEL TRANSPORTATION • COAL**

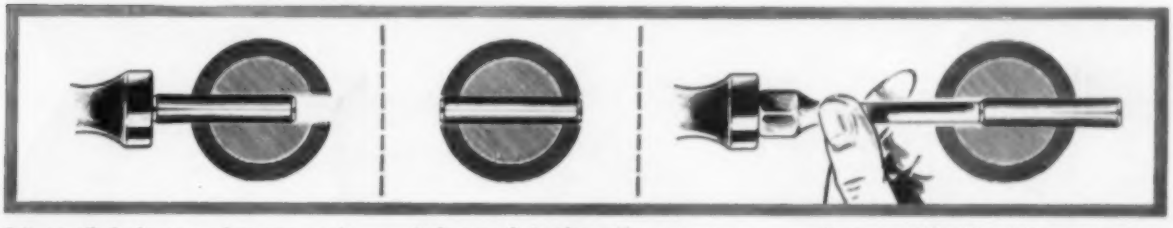
**THE Cleveland-Cliffs IRON COMPANY**
UNION COMMERCE BUILDING • CLEVELAND 14, OHIO

# what makes this fastener DIFFERENT?

Several things. Rollpin® is a slotted, chamfered, cylindrical spring pin which drives easily into a hole drilled to normal production standards. It locks securely in place, yet can be drifted out and reused whenever necessary. This eliminates special machining, tapping, and the need for hole reaming or precision tolerances. Rollpin replaces taper pins, straight pins and set screws; for many applications it will serve as a rivet, dowel, hinge pin, cotter pin or stop pin.

And here's another difference that makes Rollpin the quality fastener in the field: ESNA's quality control builds consistent strength and performance into every Rollpin. Rollpin is uniform as to shear strength, dimensions, hardness, and insertion and removal forces.

## HOW YOU INSERT IT



**Drives easily** by hammer, arbor press, or air cylinder and can be readily adapted to an automatic hopper feed. Requires only a standard hole, drilled to normal production-line tolerances.

**Locks securely in place** without using a secondary locking device; won't loosen despite impact loading, stress reversals, or severe vibration.

**Removes readily** with a drift pin without damage to pin or hole, can be used again and again in original hole.

## HOW YOU SAVE

You pay less for Rollpins than for most tapered, notched, grooved or dowel pins. Installation costs are substantially less than for any fastener requiring a precision fit or secondary locking operations.

Because of their tubular shape, Rollpins are lighter than solid pins. Production maintenance is reduced with Rollpins: they do not loosen and because of their spring action they tend to conform to the drilled hole in which they're inserted, without material hole wear, eliminating the necessity of re-drilling or using oversize pins.

## MATERIALS AND SIZES

Standard Rollpins are made from carbon steel and Type 420 corrosion resistant steel. They're also available in beryllium copper for applications requiring exceptional resistance to corrosive attack, good electrical, anti-magnetic, and non-sparking properties. Stock sizes range from .062" to .500" in carbon and stainless steels.

ROLLPIN®

ESNA

**ELASTIC STOP NUT CORPORATION OF AMERICA**

**Dept. R40-560, 2330 Vauxhall Road, Union, New Jersey**

*Please send me the following free fastening information:*

- ☐ Rollpin Bulletin
- ☐ Elastic Stop nut Bulletin
- ☐ Here is a drawing of our product. What self-locking fastener would you suggest?

Name _____ Title _____

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Street _____

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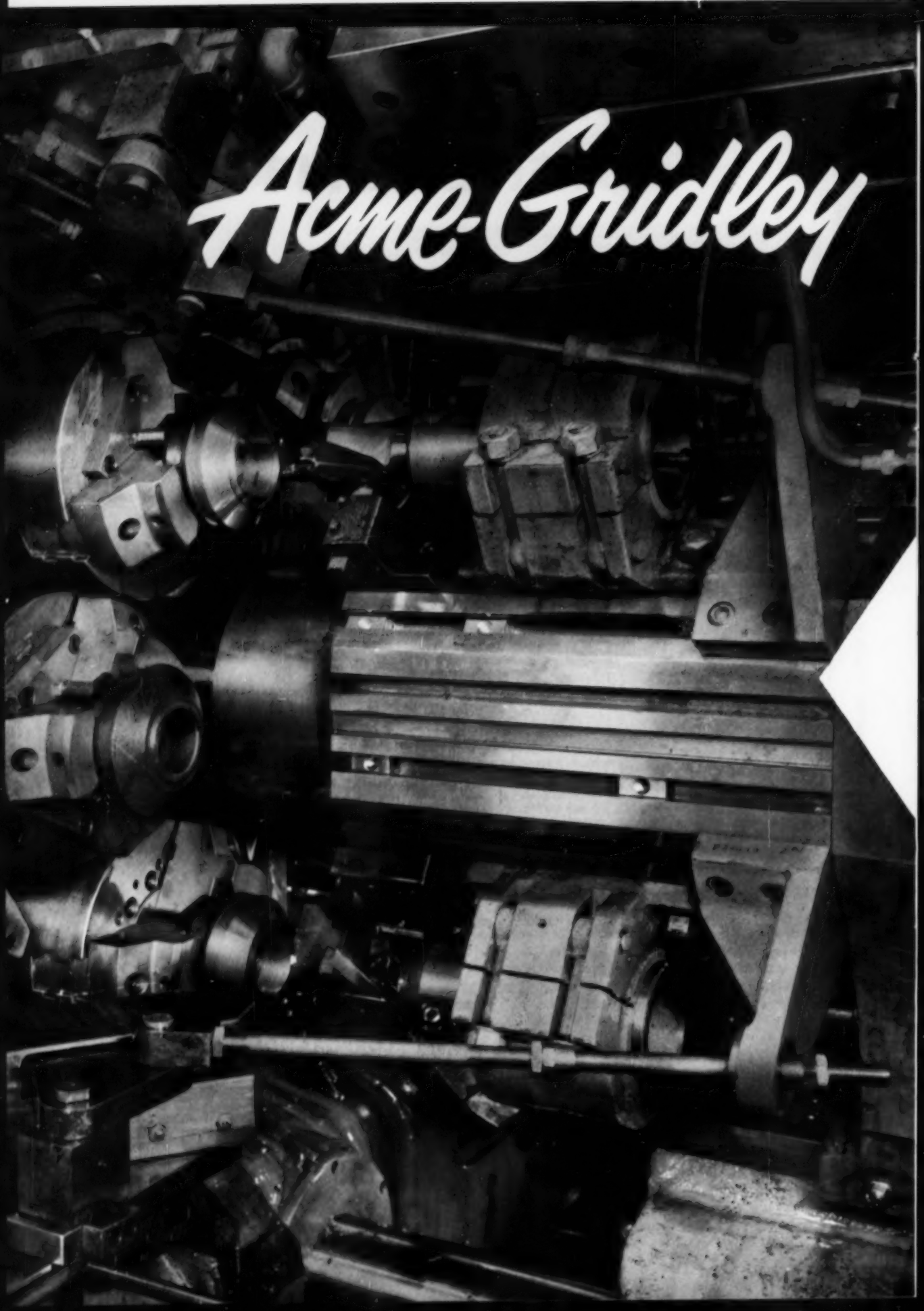

Acme-Gridley

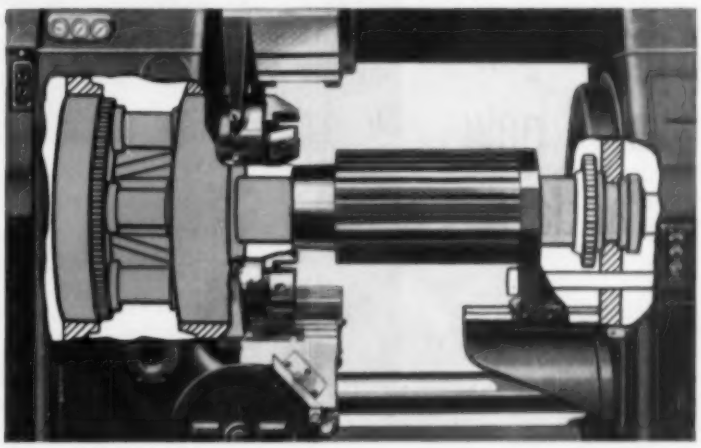
# sound basic design

## means greater production at lower cost

Accurate alignment of the tools and the work, every time the carrier indexes—and the rigid maintenance of this very precise alignment throughout every machining operation—provides greater precision all day long, less inspection, fewer rejects.

This accuracy resulting from sound basic design is one of the many reasons why Acme-Gridleys are setting new records for consistently accurate production every day.

- Spindle carrier integral with stem.
- End toolslide provided with bushings closely fitted to carrier stem and protected by front and rear seals.
- Toolslide further supported by rugged guide arm to heavy guide plate below carrier stem.
- Two wide spindle carrier bearings in headstock frame and a heavy-duty bearing in gear box provide maximum support.



LET US TELL YOU MORE ABOUT *Acme-Gridley* BASIC DESIGN

This is but one of many BASIC DESIGN features which are responsible for Acme-Gridley's outstanding performance records. May we send you additional information? Or, better yet, let us send a representative to discuss possible production short cuts with you.

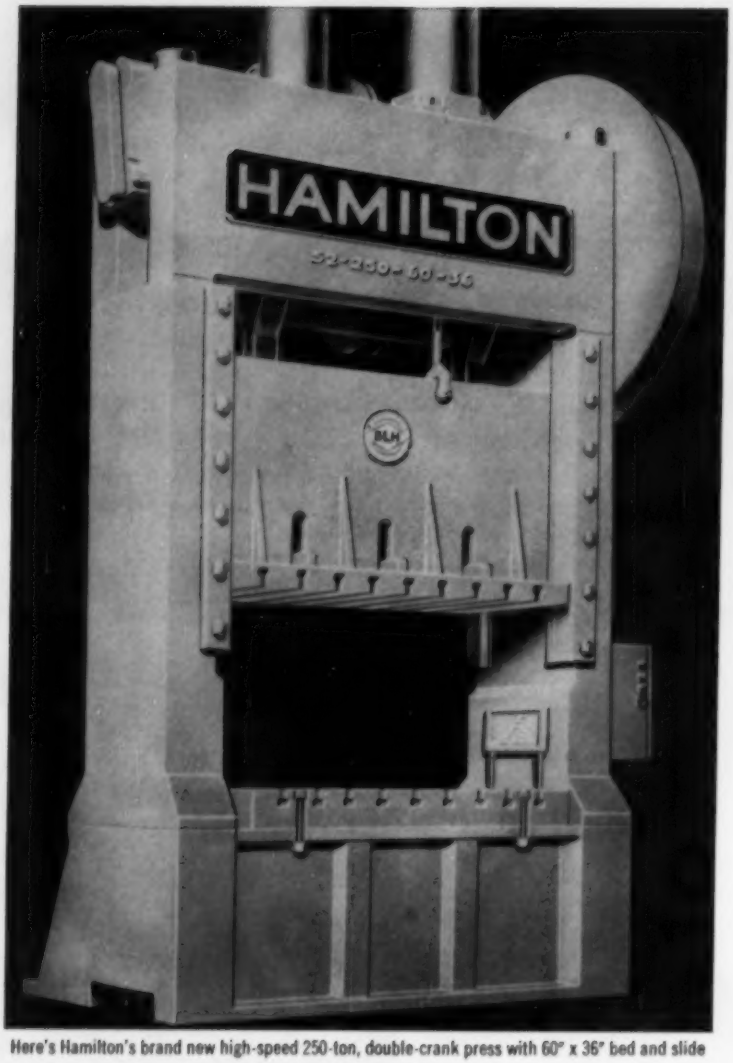
# National Acme

THE NATIONAL ACME COMPANY, 189 EAST 131ST STREET, CLEVELAND 8, OHIO

SALES OFFICES: • Newark, N. J. • Chicago, Ill. • Detroit, Mich.

# *News from Hamilton!*

## 100 to 300 ton press line sets new standards




Here's Hamilton's brand new high-speed 250-ton, double-crank press with 60" x 36" bed and slide

For the first time in the industry, Hamilton gives you 100 to 300 ton presses built to meet exacting automotive production standards . . . standards pioneered in the automotive field through more than thirty years of Hamilton press leadership.

Every one of these 2-point, single acting, straight-side, double-crank presses is a brand new design. Each is engineered for constant top-speed, top-quality production—without profit-robbing downtime. Each is built for complete operating flexibility. Here are just a few of Hamilton's built-in extras that mean more operating profit for *you:*

- rugged welded steel construction
- mechanically interlocked air clutch and brake
- barrel-type motorized slide adjustment
- automatic lubrication
- pneumatic flywheel brake
- die lights
- die cushions
- pneumatic counterbalances
- interlocked electrical clutch control

Exact specifications are adjustable to your individual requirements. Special electrical controls are available to meet particular electrical standards.

It will mean money in your pocket to find out today how these all-new Hamilton presses can help you turn out high quality stampings fast . . . without costly production downtime. Get the full story on these new standards for 100 to 300 ton presses . . . from Hamilton Division, BLH Corporation, Hamilton, Ohio.

BALDWIN · BLH · LIMA-HAMILTON

**HAMILTON DIVISION**
**BALDWIN-LIMA-HAMILTON**

DIVISIONS: Austin-Western • Eddystone • Electronics & Instrumentation • Lima • Loewy-Hydropress • Madsen • Pelton • Standard Steel Works

# QUALITY REFRACTORIES AND INSULATION

## GOOSE LAKE FIRE CLAY BRICK AND CLAYS

**Ground Fire Clay.** A smooth, high quality, plastic fire clay with low shrinkage for laying up fire brick and other fire clay refractories.

**Fire Clay Flour.** Extra fine preparation of clay for laying up the brick with tight joints and for molding sand bond.

**Grundite Bond Clay.** Special bond clay containing "Illite," a mineral that improves molding sands for malleable and gray iron castings.

**Fire Clay Brick.** Dense, well-burned plastic fire clay brick for iron and steel ladles, cupolas and for general intermediate heat duty requirements.

**Firox Cupola Mix.** New type mixture for lining cupolas and ladles by gun or hand application.

**Castables.** Refractory grog with hydraulic bonds for use as a concrete.

## Chem-Brix CHEMICALLY BONDED - NOT KILN FIRED

**Carbon.** Chemically bonded Carbon Chem-Brix assure longer service and less spalling, especially for iron and Bessemer steel ladles.

**Silica.** New type chemically bonded silica brick with low porosity and greater density than other silica brick. It is more refractory and has excellent expansion properties to insure superior service life.

## THERM-O-FLAKE HIGH TEMPERATURE VERMICULITE INSULATION

**Coating.** An insulating cement for application as a plastic on furnace brick-work exposed to temperatures up to 2000°F.

**Brick.** Molded vermiculite brick used for back-up insulation. Provides a strong, resilient cushion which absorbs expansion of refractory brick-work without disintegration.

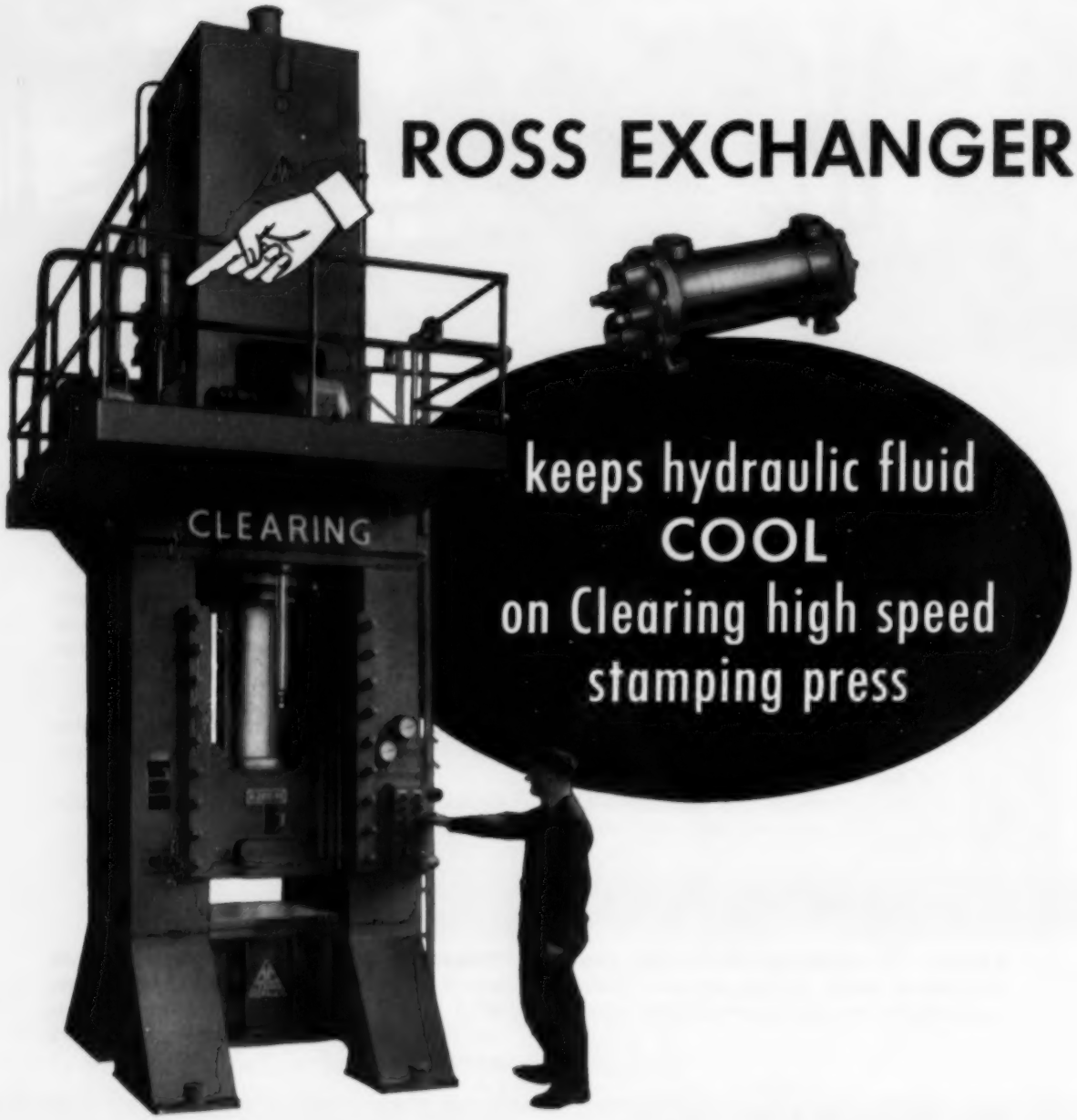
**L.B. Block.** Pressed block with high insulating efficiency and unusual structural strength for use up to 1900°F.

**Concrete.** A prepared structural material containing vermiculite, Lumnite cement bond and specially selected refractory aggregates.

# ILLINOIS CLAY PRODUCTS CO.

MAIN OFFICE: Barber Building, Joliet, Illinois • SALES OFFICE: 208 S. LaSalle Street, Chicago, Illinois

# ROSS EXCHANGER




Performing short draw operations, this 300-ton Clearing Hydraulic Stamping Press is used in high speed production of shells.

To prevent pump slippage from overheated, thinned oil, Clearing furnished a Ross Type BCF Exchanger.

"The purpose of the Ross Exchanger is to keep hydraulic fluid cool. Ross equipment has proven itself dependable and efficient," says Clearing Machine Corporation, Division of U.S. Industries, Inc.

First in ruggedness and high thermal efficiency, Ross Exchangers are regularly installed on practically every type and make of machinery requiring temperature control of lube oil, jacket water and hydraulic fluid. Pre-engineered and fully standardized, they're available in a wide range of sizes to meet your requirements.

For additional information, request Bulletin 1.1K5. Ross Heat Exchanger Division of American-Standard, 1431 West Avenue, Buffalo 13, N. Y. In Canada: Kewanee-Ross of Canada Limited, Toronto 5, Ont.

ROSS | ROSS HEAT EXCHANGER PRODUCTS

*USS Glacier, world's largest icebreaker, lead ship in Navy expedition "Operation Deepfreeze"*

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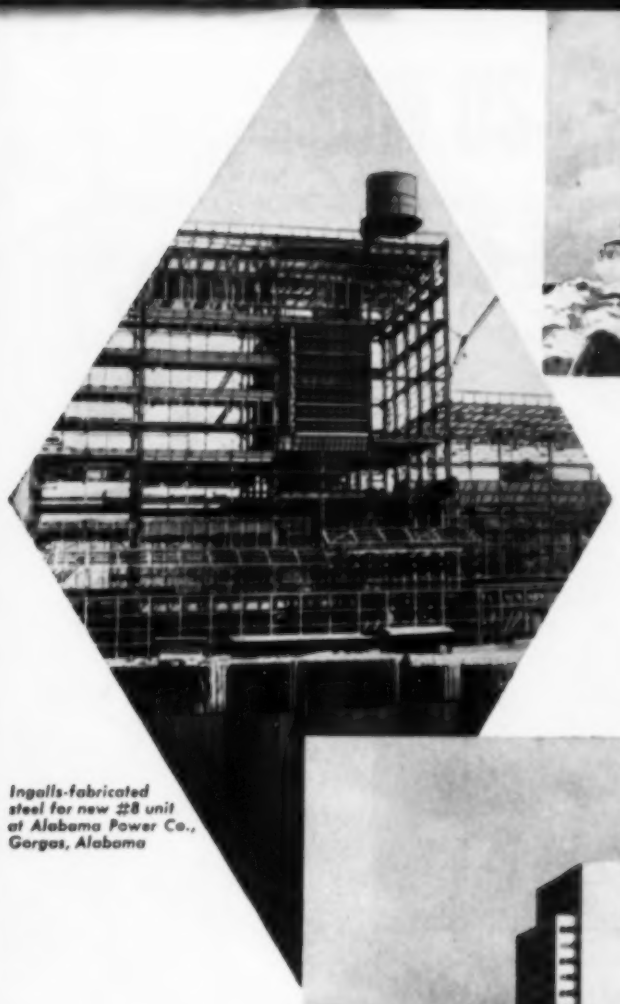
Ingalls is today serving industry and government. Can we help you?
For shipbuilding . . . there is The Ingalls Shipbuilding Corporation, Builder of such vessels as the USS Glacier, large tankers, naval vessels, passenger liners, cargo vessels, barges, rigs, towboats and yachts.
For steel fabrication . . . there is The Ingalls Iron Works Company, a major fabricator of steel throughout the country for power houses, buildings, bridges, gymnasiums, etc.



*Ingalls-fabricated steel for new #8 unit at Alabama Power Co., Gorgas, Alabama*

*Prudential Life Insurance Company building, Jacksonville. Steel fabricated and erected by Ingalls.*

*Ingalls-built Birtank loaded on lowboy for easy shipment.*

For plate and tank work . . . there is Birmingham Tank Company, which furnishes oil storage tanks, pressure vessels, bins, stacks, rotary kiln dryers, ducts, flues and blast furnaces —with facilities for fabricating steel, aluminum, stainless steel and other alloys.
For steel erection . . . there is The Ingalls Steel Construction Company, which erects structural framework for buildings, power houses, tanks, bins and stacks.
You are invited to write for special literature.

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# In a Mess?

## CALL "ELL" AND "ESS"!

The best laid new product plans sometimes bog down because of fastening problems.

On paper the product looks good—*is* good . . . is designed in every way for efficiency and salability.

But putting it together may be another story. Special type bolts or nuts may be required to do the job right.

Whenever a "crisis" like this turns up, call in "ELL" & "ESS", the helpful Lamson & Sessions "can do" pair. They can engineer the required fastener, they can make it and many times they save you money.

**The LAMSON & SESSIONS Co.**

1971 West 85th Street • Cleveland 2, Ohio

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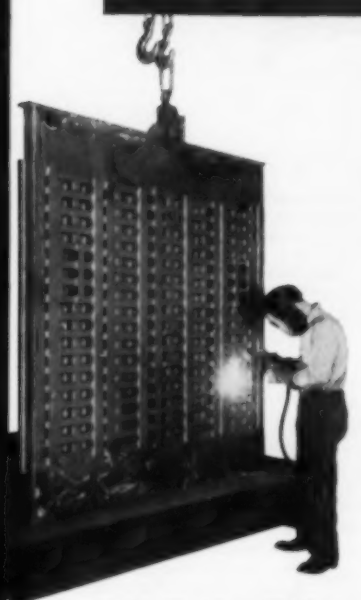
# HOW USS "T-1" STEEL IMPROVES THESE PRODUCTS...

## . . . Lops Off 1,047 Lbs.

Trays for ore clean-up buckets need tremendous resistance to impact, abuse, and abrasion. Blaw-Knox Company, Pittsburgh, Pa., found that they weigh half a ton less, and cost less to fabricate when made from USS "T-1" Steel plate instead of heavy steel castings.



## . . . 534 Easier Welds

This printing press bedplate manufactured by Graver Tank & Manufacturing Co., Inc., must be welded in 534 places. High alloy steel with the needed strength was very difficult to weld. But USS "T-1" Steel is easy to weld . . . and has the needed strength to keep these bedplates, used on high-speed printing presses, as lightweight as possible.

## Three Ways Better . . .

International Nickel Company of Canada expects USS "T-1" Steel to increase the service life, to reduce the maintenance, and lower the long-term cost of ore cars like this one; because "T-1" Steel has far greater strength, toughness, and resistance to abrasion than steel used previously. The car builder, Canadian Car and Foundry Co., Ltd., has had no difficulty fabricating this very strong alloy steel.

## HOW USS "T-1" STEEL CAN HELP YOU

The great strength and toughness of USS "T-1" Steel (90,000 psi, minimum yield strength) helps you to increase the capacity and durability of power-shovel buckets and storage tanks without increasing weight.

Its excellent weldability enables you to fabricate large equipment out in the field without heat treatment. It thus reduces fabricating and shipping costs and speeds up construction.

Its unusual toughness at sub-zero temperatures improves service life of equipment that must take impact, abrasion, and abuse in all weather.

USS "T-1" Steel also gives you good creep-rupture strength to 900°F. It often can be substituted for more expensive steels that are more difficult to fabricate. There is a place for "T-1" Steel somewhere in your designs. Write, wire, or phone for complete information. United States Steel, Room 5309, Pittsburgh 30, Pa.

UNITED STATES STEEL CORPORATION, PITTSBURGH • COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO • TENNESSEE COAL & IRON DIVISION, FAIRFIELD, ALA.

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**USS "T-1" CONSTRUCTIONAL ALLOY STEEL**

See The United States Steel Hour. It's a full-hour TV program presented every other week by United States Steel. Consult your local newspaper for time and station.

UNITED STATES STEEL

# Why BALANCED CHEMICAL ACTIVITY in a cutting oil?

*Left.* Cupro-nickel bushing, cut in half to show internal threads, produced with a competitive straight oil.

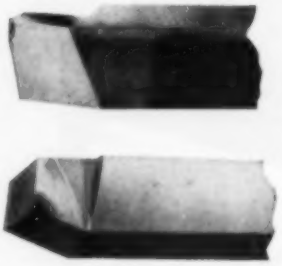
*Right.* Same type cupro-nickel bushing produced with Stuart's Thredkut X-18—providing controlled chemical activity.

The touch of a cutting oil with *balanced* chemical activity is easily recognized. It's the exceptionally smooth, satiny finish on part after part, even from soft, tough, stringy material . . . and increased tool life.

Stuart's Balanced Cutting Oils have controlled active sulphur and chlorine held in true chemical combination. Each oil is balanced to meet a specific range of job requirements from tapping, threading, gear shaping and gear hobbing to general purpose automatic screw machine work. Stuart oils with high sulphur activity are processed for the more difficult machining of soft, tough, stringy materials such as low carbon and stainless steels, monel metal and jet engine alloys. Oils with lower sulphur activity are designed for high speed machining of free-cutting materials such as B1112, B1113, leaded screw stocks, brass and aluminum alloys.

The "active" sulphur content of Stuart's Balanced Cutting Oils, as opposed to "lazy" sulphur, provides the anti-weld qualities that are so necessary to obtain smooth finishes. The active chlorine and fatty oil content provides the improved lubricity and temperature control to assure the best possible results in production.

Have "the Man in the Barrel", your Stuart Representative, assist you in selecting the right cutting oil for your job. Write for Stuart's Cutting and Grinding Fluid Selector and Dilut-O-Graph Folder, too. It's a quick guide to starting recommendations on any job.



*Top:* Abnormal front clearance wear of cutting tool caused by excessive sulphur activity of cutting fluid.

*Bottom:* Cratering of cutting tool caused by insufficient sulphur activity.

**D. A. STUART OIL CO., LTD., 2735-37 S. Troy St., Chicago 23, Ill.**

**More than a "Coolant" is Needed**

**Stuart Oils**

*Plants in:* Chicago, Detroit, Cleveland, Hartford, and Toronto, Ontario.

Branch Warehouses and Representatives in principal metal working centers in the United States, Canada and Europe.

*Time Tested Cutting Fluids and Lubricants*

(Advertisement)

# DESIGNING WITH ALUMINUM

NO. 19

This is one of a series of information sheets which discuss the properties of aluminum and its alloys with relation to design. Extra or missing copies of the series will be supplied on request. Address: Advertising Department, Kaiser Aluminum & Chemical Sales, Inc., 1924 Broadway, Oakland 12, California.

## PRE-ANODIZING TREATMENTS FOR ALUMINUM

One of the many surface treatments being used for aluminum products is the controlled formation of a relatively thin but durable oxide film. Films of this type are called anodic films and their qualities may be varied according to the particular end use of the product being manufactured. Because they are stable in many natural and man-made environments, they offer excellent resistance to corrosion. Through a variety of processes, it is possible to make anodic coatings that offer attractive decorative finishes, that resist abrasion or that act as electrical insulation. Certain anodic finishes are being dyed to create some of the most brilliant colors available in metal products.

Anodic coatings are fairly simple to apply. The process consists of passing an electric current between the metal and an acid solution in which the metal is immersed. However, surface contaminants that are unavoidable during fabrication will affect the coating adversely if they are not removed before anodizing. Oil and metal contaminants picked up by the aluminum surface will cause darkening or streaking of the anodic film and may even inhibit its formation. Therefore simple pre-anodizing treatments are of great importance in obtaining a uniform, continuous anodic film. The choice of the optimum treatment depends upon the ultimate purpose of the anodic coating.

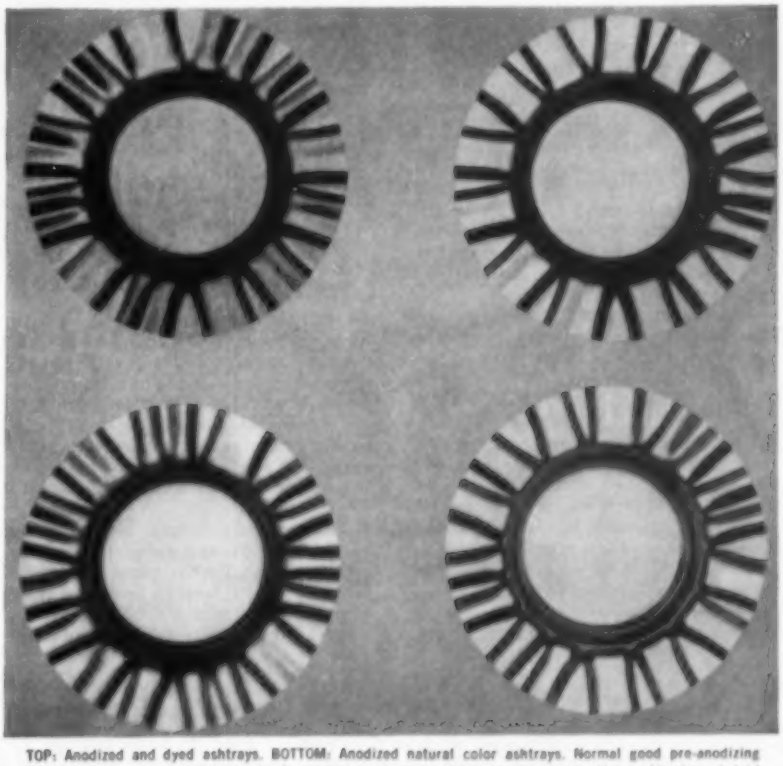
If heavy soil or grease are present, their removal by vapor degreasing or an inhibited alkaline cleaner should be the first step in any pre-anodizing treatment. Both of these cleaning methods are relatively inexpensive, require little handling and may be used to clean inaccessible surfaces thoroughly.

Vapor degreasing may be done by either a batch method or as part of a continuous processing line. The metal to be cleaned is passed vertically through a vaporized solvent such as trichlorethylene or perchlorethylene. In less than a minute the vapor, which condenses on the cool metal and runs off, effectively removes normal soil. When the oily or greasy contamination is extremely heavy, the metal may be wiped with a solvent before entering the vapor degreaser.

Inhibited alkaline cleaners, 4 to 8 oz. per gallon of water, are generally operated at 160F to 180F. The metal to be cleaned may be sprayed or immersed in the solution for two to five minutes, after which it is rinsed in water. When cleaning parts that have small crevices, a quick dip in dilute nitric acid may be necessary as an additional rinse to remove residues from the cleaning solution. These parts are then water rinsed again before proceeding to the next finishing treatment.

### For General Use

A caustic etch is one of the more common treatments used for preparing aluminum surfaces for anodizing. A typical bath would contain five per cent caustic soda. Numerous proprietary compounds of this type are available. The metal to be etched is immersed in this bath, which is usually maintained at 160F, for a period of two to five minutes. A lustrous, satiny finish can be obtained by caustic etching certain alloys, and the depth of the etch can be controlled by varying temperature, time or concentration of caustic. Variations in either the etching conditions or in the etchants may also be used for creating different shades, or degrees of total reflectivity. Sodium fluoride is frequently added to caustic etch solutions to obtain a desired effect. This addition imparts a finer, more uniform etch to the aluminum surface.



TOP: Anodized and dyed ashtrays. BOTTOM: Anodized natural color ashtrays. Normal good pre-anodizing treatment was used on ashtrays at left; normal good pre-anodizing treatment, plus Kaiser Aluminum bright dip, used on ashtrays at right.

Still finer etching can be obtained by using an acid fluoride bath which produces a white surface that has high total reflectivity. A solution of this type,

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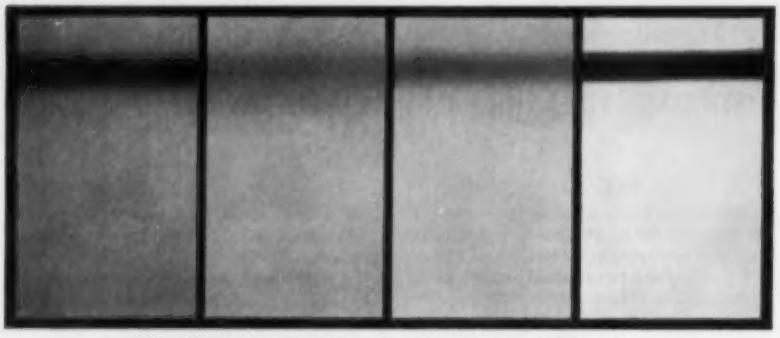


Alloy 5357 sheet anodized after various pretreatments. Note differences in specular reflectivity shown by black bar mirrored on surfaces.

which is used in finishing diffuse light reflectors, is made of a mixture of sulfuric and hydrofluoric acids.

## For Minimum Loss of Metal

To clean aluminum with a minimum loss of metal prior to anodizing, a chromic-sulfuric acid mixture is used. This mixture effectively removes oil stain, oxide and heavy metal inclusions. However, it attacks the aluminum only slowly. Consequently, the anodized surface may not appear as uniform as a surface prepared with a caustic or acid etch treatment. A typical mixture of this type would contain 3.5% by weight chromic acid (anhydride) and 17.5% by weight of concentrated sulfuric acid (specific gravity 1.84). The bath is operated at 180F, and the aluminum is immersed in it for about five minutes. As in the case of caustic or acid etching, the operation can be controlled by changing any of the variables in the process.

## For Decorative Purposes

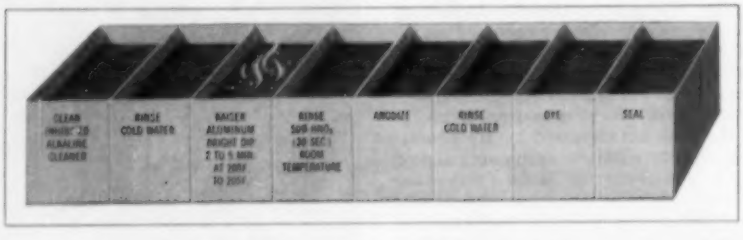
One of the chief purposes of anodizing aluminum is to provide a clear, highly reflective coating for decorative applications. The appearance of giftware, electrical appliances, automobiles, and many other products is being enhanced with brightly anodized aluminum trim of a functional or purely decorative nature. In many products, dyes are being used to add color to this metallic sparkle.

To create this attractive anodized finish the brightening process which precedes anodizing must have a uniform action across the entire surface of the metal. Several types of brightening processes are available. An electrochemical process, requiring the passage of an electric current between the metal and a special acid or alkaline bath in which it is immersed, is used on such highly polished items as light beam reflectors. Concentrated acid baths requiring no electricity during immersion may be used for cleaning and brightening a great many aluminum alloys. Unfortunately, these processes are somewhat expensive and the fumes given off during operation can create a hazard to workmen.

Dilute acid solutions are generally easier to handle and are quite effective on most alloys. Furthermore, dilute acid baths are considerably less expensive to prepare and maintain. Kaiser Aluminum Bright Dip, introduced a few years ago, is a dilute acid brightener which is being used by many anodizers of aluminum end products that depend on a pleasing appearance to increase their sales appeal.

Normal dipping time for Kaiser Aluminum Bright Dip is two to five minutes, and the bath is maintained at 200F to 205F. A flow sheet for using this Bright Dip in finishing an aluminum item which was to be color-anodized would include these steps:

1. Clean
   Inhibited alkaline cleaner
2. Rinse in cold water
3. Kaiser Aluminum Bright Dip
   2 to 5 minutes at 200F to 205F
4. 50% $HNO_3$ rinse (30 sec.)
   room temperature
5. Rinse in cold water
6. Anodize
7. Rinse in cold water
8. Dye
9. Seal




For other applications, such as in the architectural field, specialized anodizing techniques may be required. Techniques of this sort are the subject of continuous study by Kaiser Aluminum's Department of Metallurgical Research. Further information concerning preanodizing treatments may be obtained by contacting the Kaiser Aluminum sales office listed in your telephone directory, or one of our many distributors. Kaiser Aluminum and Chemical Sales, Inc., *General Sales Office*, Palmolive Bldg., 919 North Michigan Avenue, Chicago 11, Illinois; *Executive Office*, 7774 Kaiser Bldg., Oakland 12, California.

Kaiser Aluminum

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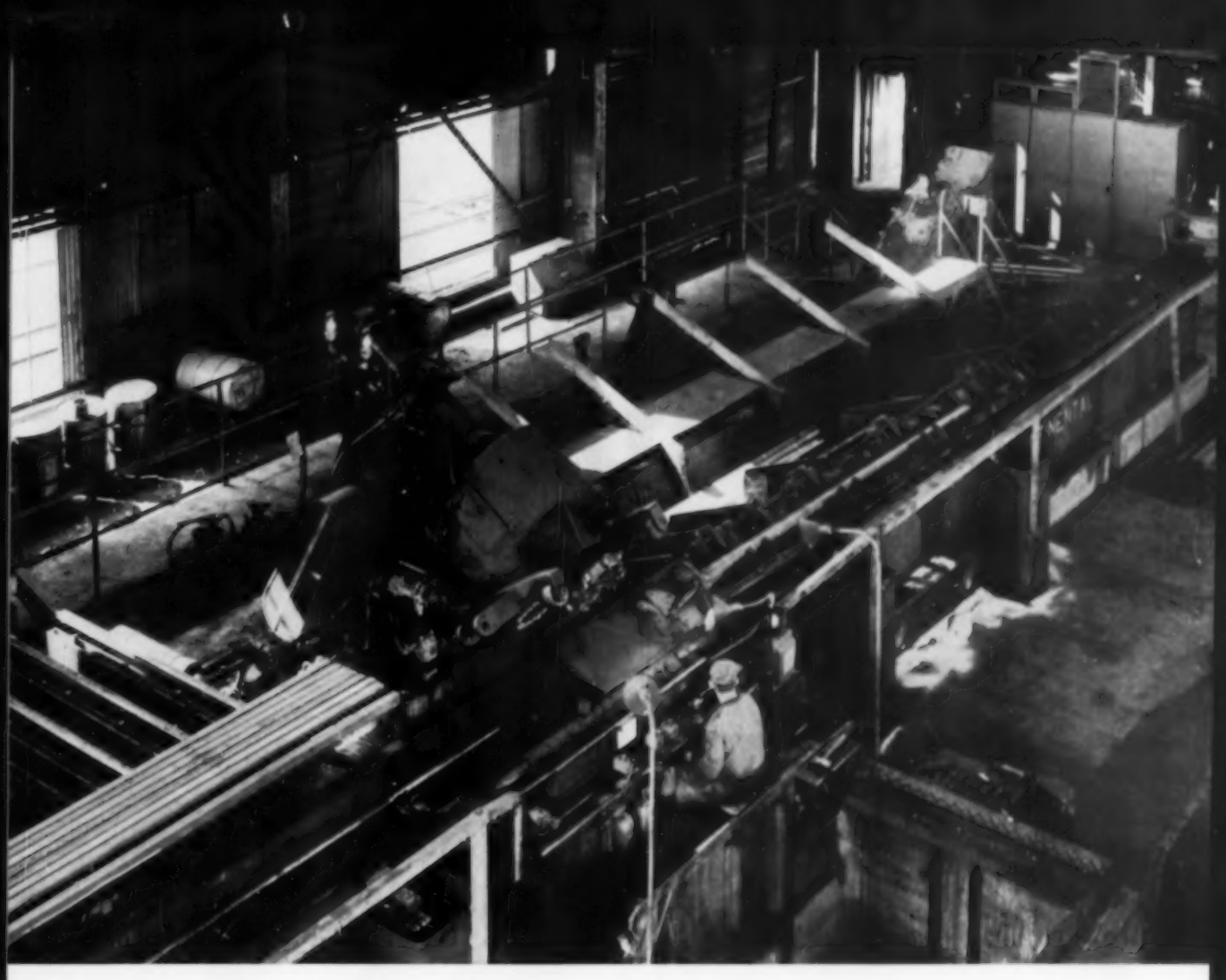

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## *for continuous, mechanical chipping*

The Continental Chipper with auxiliary equipment is a complete mechanical system for sorting, handling, inspecting and chipping billets. This integrated system has demonstrated in-service cost savings over manual conditioning. It represents a wise investment in long range modernization programs for conditioning for subsequent rolling in merchant and bar mill operations.

Product quality improvement is immediate, positive. Precise chipping is accomplished by a non-traveling cutter head under which the billet moves in a fashion similar to a milling machine. All chipping is done at close range, immediately in front of the operator. This single operator, located in front of the cutter head controls the entire operation including all material handling.

The chipper is equipped with special interlocking devices which eliminate unsafe operation. Usual chipping bay hazards such as high pressure air lines, improperly handled chisels, and flying chips are removed. The Continental Chipper accommodates billets up to 30 feet in all merchant and bar mill sizes.

For complete details, write for illustrated booklet.

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# *into your shop*
# CUTTING OILS

**Gulfcut is the new brand name for Gulf's complete line of modern, up-to-date cutting fluids. Each Gulfcut oil is scientifically compounded to meet the most exacting requirements for tool life, accuracy of work, and surface finish.**

**This new line of Gulfcut oils includes mineral-lard oils, sulfurized-mineral oils, sulfurized-mineral lard oils, sulfochlorinated-lard oils, and emulsifying oils—outstanding cutting oils that contribute to better results in every metal cutting operation.**

**Have a Gulf Sales Engineer show you how one or more of the Gulfcut line of cutting oils can help you get increased tool life and lower machining costs in your shop. Consult the telephone directory for the number of your local Gulf office.**

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## ...that fits your purpose

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You can call on Sandvik's knowledge of special spring steel applications for assistance in determining the type of steel required. Then, from its extensive range of qualities, finishes and sizes, Sandvik can usually pinpoint a steel that's practically "custom-tailored" for you.

For applications which require special physical properties, high fatigue life, fine surface finish, accurate and uniform gauge, check with Sandvik.

You can get Sandvik cold rolled specialty strip steels:

- **In special analyses for specific applications.**
- **Precision-rolled in thicknesses to fit your requirements.**
- **In straight carbon and alloy grades.**
- **Annealed, unannealed or hardened and tempered.**
- **Polished bright, yellow or blue.**
- **With square, round or dressed edges.**
- **Wide range of sizes in stock—or slit to your specifications.**

*Ask your nearest Sandvik office for further information or technical assistance.*

*Write for this Free, complete Sandvik catalog.*

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Sandvik Quality Steels

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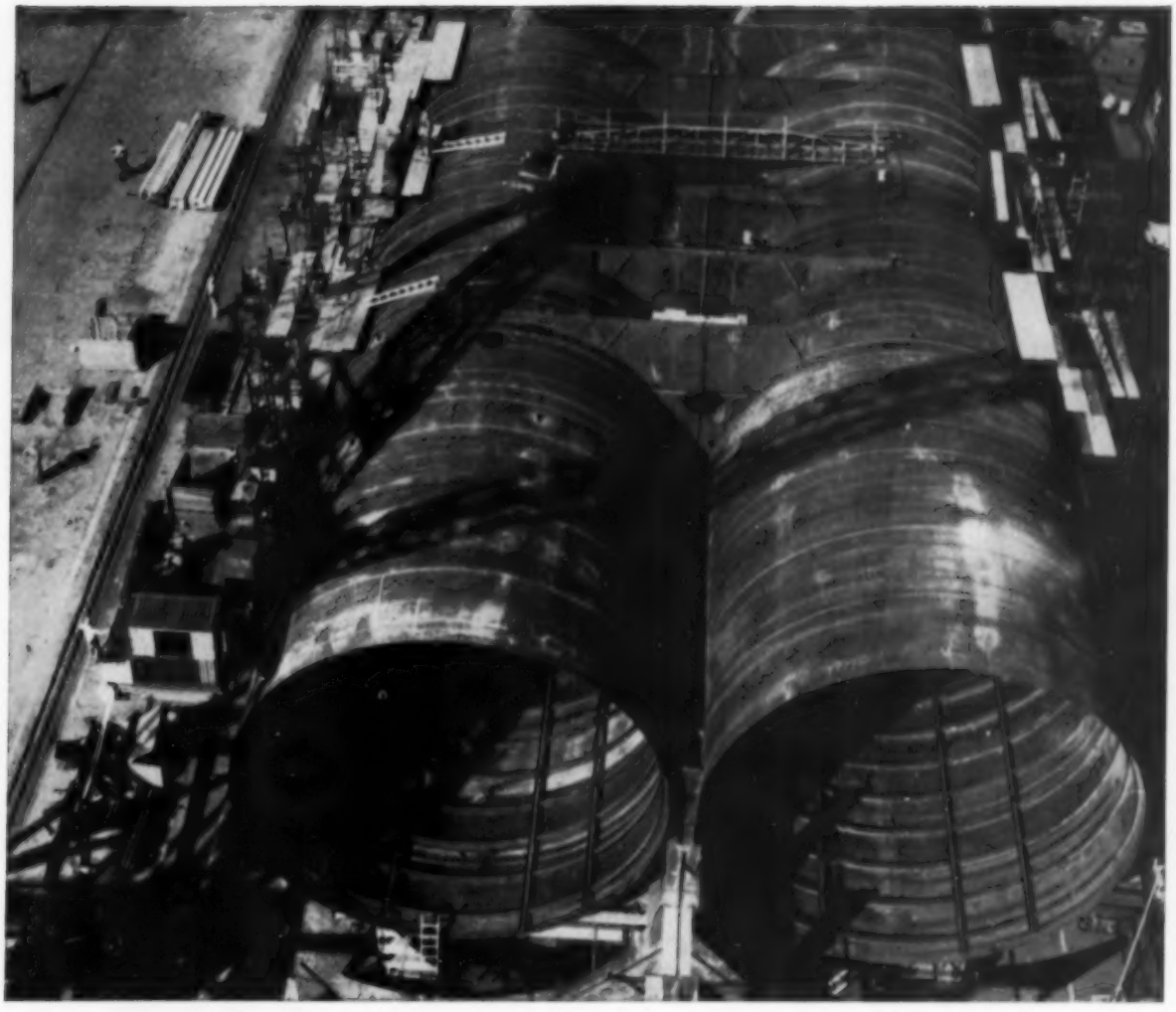
**SANDVIK *Coromant* CARBIDE TIPPED TOOLS AND BLANKS**

- **In a wide variety of tools and blanks from stock — including many shapes and designs which have been considered "specials" before.**
- **In all standard grades with improved performance to suit a wide range of applications.**
- **Grades permanently color-identified on the end of tool shank and etched in the carbide blanks.**
- **In the new, time saving "Coromant Combination Cutter."**

*From ore to finished product within the same company.*

(Advertisement)



# GAS HELPS MARYLAND SHIPBUILDING SHAPE FRAMES FOR NEW HARBOR TUNNEL

A huge Gas-fired furnace at Maryland Shipbuilding and Drydock Company, Baltimore, Maryland proved its advantages when that company was awarded a construction contract for part of Baltimore's vast new $140,000,000 Harbor tunnel project.

When Maryland Shipbuilding and Drydock Company installed their two new furnaces—for heating plates and angles—it was decided to use Gas, based on its superior temperature control, lower maintenance, and higher output due to faster heating-up and less loss of time in changing operating temperatures.

The Gas-fired furnace is now heating 26'6" long T-bars that are shaped and welded, in sets of four, to form 35' circular frames used in the tubular sections of the Harbor tunnel.

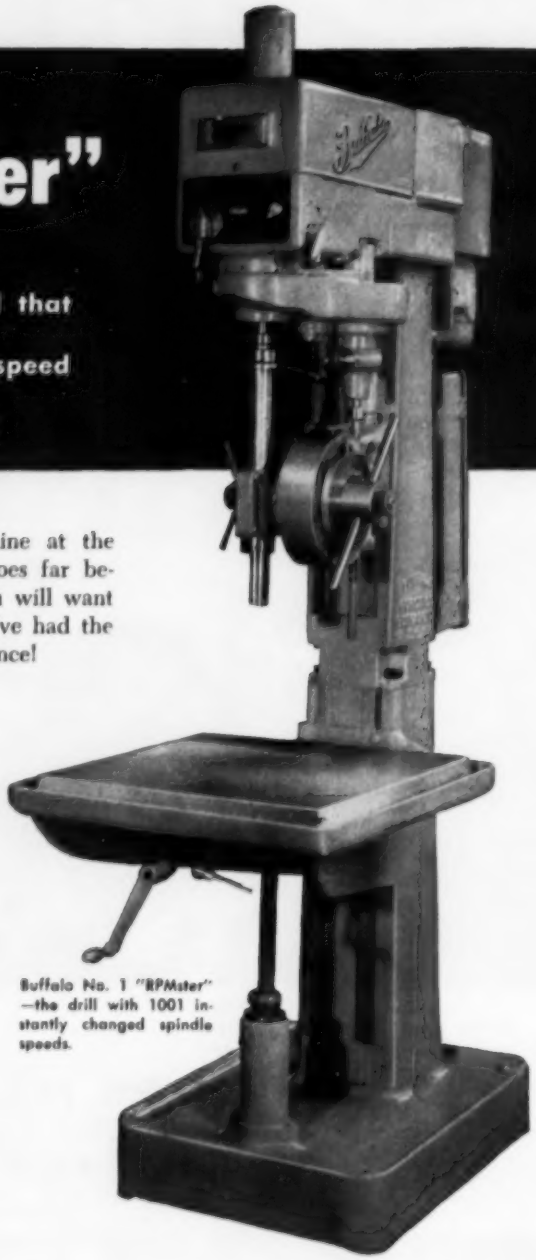
For information on how Gas can help you in your production operations, call your Gas Company industrial specialist. He'll be glad to discuss with you the economies and outstanding results you get with Gas and modern Gas-fired industrial equipment. *American Gas Association.*

## You Have to Operate

# THE NEW "RPMster"

## to Believe It!

- . . . So perfectly balanced and fitted that it's vibrationless!
- . . . So smooth in feed and spindle speed adjustment!
- . . . So responsive to your commands!



Buffalo No. 1 "RPMster" —the drill with 1001 instantly changed spindle speeds.

Those who saw this great new drilling machine at the NMTBA Show will verify it. The "RPMster" goes far beyond the ordinary concept of a "drillpress". You will want to have one or more working for you, after you've had the experience of operating one—and it is an experience!

First, its gearless drive and perfectly fitted spindle provide extreme smoothness and quietness of operation.

Second, you can instantly get any low range spindle speed from 100 to 550 R.P.M.s at the touch of a lever—and, by switching to high range in a few seconds, any speed from 500 to 3000 R.P.M.s. Here is the really versatile machine for smooth work flow through the wide range of drilling, reaming and tapping operations.

And as the "Buffalo" power feed obeys your touch, you know you're completely in command of this powerful 88" high machine. The "RPMster" lives up in every way to the "Buffalo" "Q" Factor* standard of performance.

Your nearby "Buffalo" representative will be glad to arrange a demonstration, or write us.

***The "Q" Factor—the built-in Quality which provides trouble-free satisfaction and long life.**

ESTABLISHED 1877 "Buffalo" MEMBER N.M.T.B.A.

**BUFFALO FORGE COMPANY**

158 MORTIMER STREET — BUFFALO, NEW YORK

Canadian Blower & Forge Co., Ltd., Kitchener, Ont.

DRILLING • PUNCHING • SHEARING • BENDING

At
MURDOCK TOOL CO.
DETROIT

spot-facing tools made of

"Desegatized"®

DOUBLE SIX
M-2 XL®

HIGH SPEED
STEEL

MURDOCK TOOL COMPANY, INC.
1747 ABBOTT STREET
DETROIT, 16
TELEPHONE WOODWARD 1-2100

December 12, 1955

Latrobe Steel Company
Latrobe , Pa.

Gentlemen:

We wish to congratulate you on the great advancement you have made in the manufacture of High Speed Steels. Your XL steels have proved far superior to any we have ever used in machinability and finish. This is the first great improvement in steel in some time, that has really been noticeable to those of us who are machining it every day.

Your steel came to my attention so forcibly due to the fact that our employees work on a bonus arrangement based on production. When checking an increase in cost on a particular job I was informed that it was due to using regular M-2 H.S.S., rather than your XL grade. My employees consistently request your steel on their jobs. This was hard to believe at first, so therefore, we ran a test job. You will be interested in the results which were as follows:

In completely turning 400 Spotfacing Tools, made of 15/16" diameter hot rolled regular M-2 H.S.S., we used 1120 R.P.M. with a feed of .0084. To turn the complete job we broke 14 throw away carbide inserts. In comparison we turned 600 of these same tools from your M-2 XL High Speed Steel, using 1400 R.P.M. and a feed of .011 . We did not break any tool bits, but wore out five of them.

In milling on these same jobs we used 110 R.P.M. with a 4½" feed on the 400 pieces. It was necessary to resharpen milling cutters once on this job. On the 600 pieces we used the same R.P.M., but increased the feed to 5½" per minute. It was not necessary to resharpen the cutters.

As you can see, we were not only able to increase feeds and speed by the use of your XL Steel in both milling and turning, but we also eliminated costly down time and scrap work caused by breakage of tool bits.

We heartily commend your firm for the fine job done.

Yours very truly,
Murdock Tool Co., Inc.
Robert M. Murdock
President

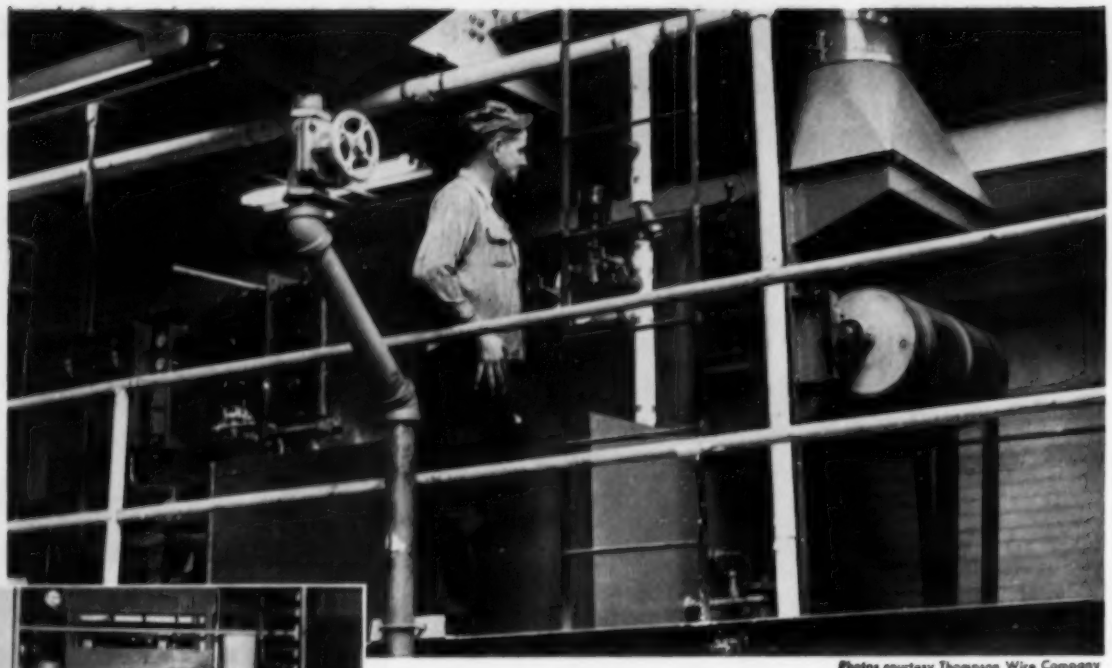
RMM/bp

Save
MACHINE TIME
and
TOOL COSTS

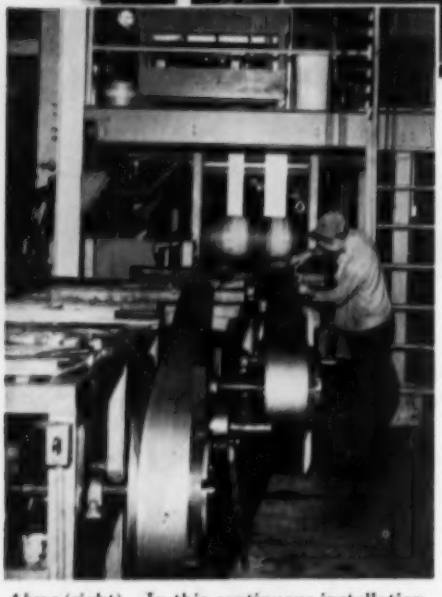
Electrite Double Six M-2 XL is a tungsten-molybdenum high speed steel containing uniformly dispersed alloy sulphides for excellent machinability and longer tool life. The even distribution of the alloy sulphides and carbide particles is a result of Latrobe's exclusive DESEGATIZED® process of manufacture.

Generous stocks and sizes of Electrite Double Six M-2 XL are available from conveniently located warehouses. Order Now — Call your Latrobe representative today for complete information.

LATROBE STEEL COMPANY
MAIN OFFICE and PLANT: LATROBE, PA.
BRANCH OFFICES and WAREHOUSES in Principal Cities



Photos courtesy Thompson Wire Company



*Above* (right)—In this continuous installation, strip steel is treated with Bonderite, then with Bonderlube lubricant. *Below*, treated strip is re-coiled as it comes out of the machine, Bonderite-Bonderlube treated.

Successive steps in forming a small case from Bonderite and Bonderlube treated strip.

**For better performance in the forming dies . . .**

***Get steel strip, mill-treated with***

# BONDERITE *and* BONDERLUBE

Here's a service that can mean real savings in your cold forming operations. Buy mill-treated steel, in coils, treated with Bonderite and Bonderlube and ready for the dies.

This specially treated strip, with its Bonderite-Bonderlube coating, is used for many products and components made by cold forming. The combination of Bonderite and Bonderlube provide such effective lubrication that severe deformations are possible without marring surface finish. Tools and dies last longer, production may be greatly increased, production costs are reduced.

Investigate mill-treated steel strip with Bonderite and Bonderlube. Ask your strip supplier about this new development.

**Bonderite, Bonderlube, Parco, Parco Lubrite, Parker Pre-Namel—Reg. U.S. Pat. Off.*

## PARKER RUST PROOF COMPANY

2158 E. MILWAUKEE, DETROIT 11, MICHIGAN

Since 1914—leader in the field

| BONDERITE | BONDERITE and BONDERLUBE | PARCO COMPOUND | PARCO LUBRITE | TROPICAL |
|---|---|---|---|---|
| corrosion resistant paint base | aids in cold forming of metals | rust resistant | wear resistant for friction surfaces | heavy duty maintenance paints since 1883 |

# TIPS FROM A ROLL MAKER'S NOTEBOOK

MACKINTOSH-HEMPHILL DIVISION, E. W. BLISS COMPANY, Pittsburgh 3, Pennsylvania

Cast mill rolls • Johnston cinder pots • rotary tube straighteners • end-thrust bearings • heavy-duty lathes • steel and special alloy castings

## Choosing rolls for slabbing and blooming mills

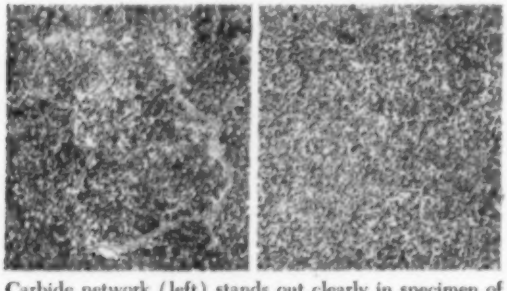
Cast steel rolls for blooming and slabbing mills must combine good resistance to fire cracking with the strength necessary to stand the severe stresses developed by these mills.

Other considerations that affect the choice of rolls include severity of the service and the method of roll cooling. Variations like these can mean good service from inexpensive rolls in one mill while in another the only practical solution lies in costlier, higher alloy rolls.

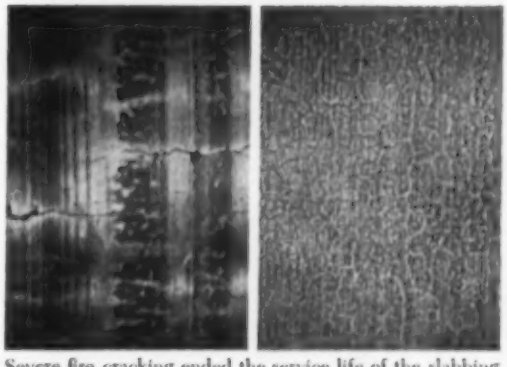
**Two heat treatments** – Heat treatment is used primarily to improve roll strength. However, heat treatment also affects resistance to fire cracking – metallurgists believe that there is a relationship between fire cracking and the elimination of the carbide network from the crystalline structure of cast steel.

Mack-Hemp has developed two heat treatments for blooming and slabbing rolls. The first is an air quench and draw, and develops maximum strength. It produces rolls with excellent resistance to the very severe localized concentration of stress that occurs each time the steel goes through a pass.

The second heat treatment, a double anneal, produces a spheroidized carbide structure with good strength and excellent resistance to fire cracking.



Carbide network (left) stands out clearly in specimen of roll with ordinary treament. Picral etch, 500 magnifications. Network in Midland Superalloy (right) has been almost completely destroyed by special Mack-Hemp heat treatment. Picral etch, 500 magnifications.



Severe fire cracking ended the service life of the slabbing roll whose surface is shown at the left. Surface of Midland Superalloy roll at right shows excellent fire cracking pattern (roll had reached worn-out diameter after more than 600,000 tons).

**Three types of rolls** – Both of these heat treatments are modifications of older practices, designed to decrease the amount of grain boundary carbide in the finished roll, thus improving fire cracking resistance. Either treatment can be supplied in the three grades of Mack-Hemp cast steel rolls recommended for slabbing and blooming mills:

***Midland Superalloy,*** a nickel-chrome-moly roll especially developed for applications where fire cracking is a severe problem. There are cases on record where sets of Midland Superalloy rolls have rolled 700,000 tons and more before reaching worn-out diameters.

***Technalloy,*** a chrome-moly roll that has thoroughly proved itself under standard operating conditions.

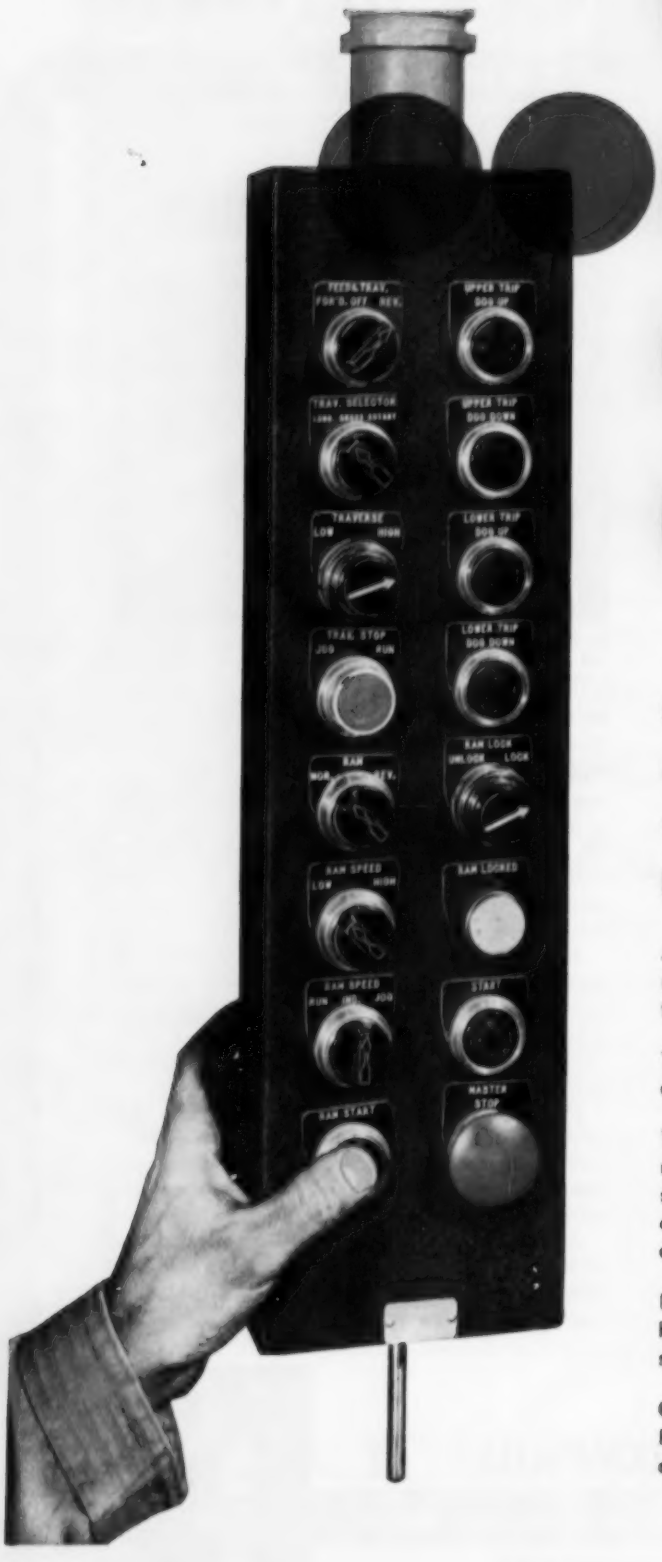
***Technisteel,*** a carbon steel roll which gives good service at low initial cost under mild-to-average operating conditions.

Squeezing maximum tonnages from your mills... at minimum roll cost... is far easier when you enlist Mack-Hemp's aid. For help with your particular rolling problem, write us today.

MACKINTOSH-HEMPHILL

*You get more tonnage from the rolls with the Striped Red Wabblers*

Division of E. W. BLISS COMPANY
PRESSES, ROLLING MILLS, SPECIAL MACHINERY




push button control

## speeds operation and set-up on new Rockford **hydraulic** slotter

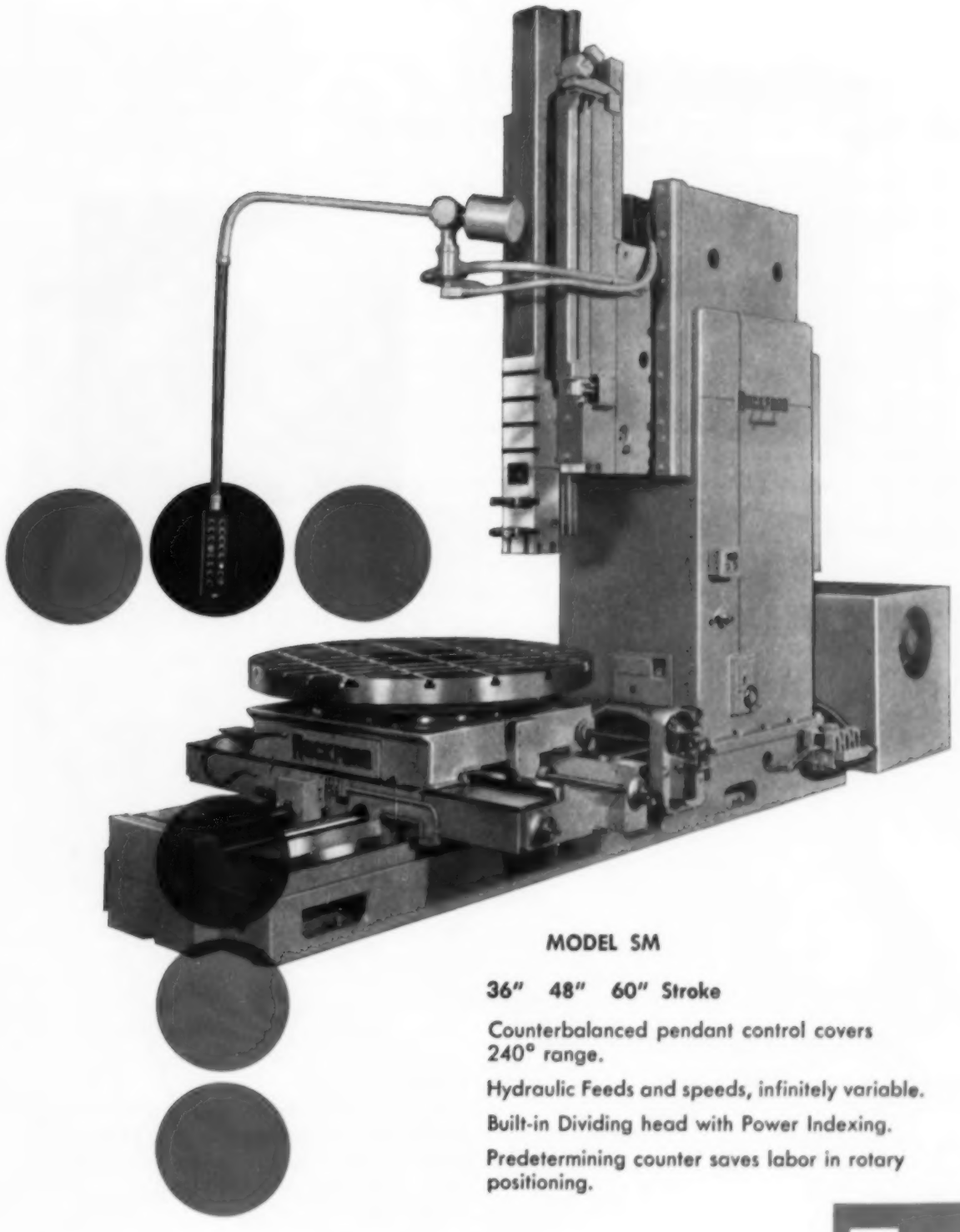
All longitudinal, transverse and rotary movements are selected and operated from the push button station of this new Rockford hydraulic Slotter.

The ram lock is pendant operated and ram stroke length and position are completely push button controlled.

Two-speed table traverse is available, enabling the machine operator to position the work to a few thousandths, without manual movements, although manual control of all movements is available from either side of the machine.

Full hydraulic drive provides two cutting ranges, one for high speeds and low cutting forces; the other for slow speeds and heavy cuts.

Get full details on this new hydraulic slotter from any Rockford Machine Tool Co. representative, or write directly to us.



**MODEL SM**

**36" 48" 60" Stroke**

Counterbalanced pendant control covers 240° range.

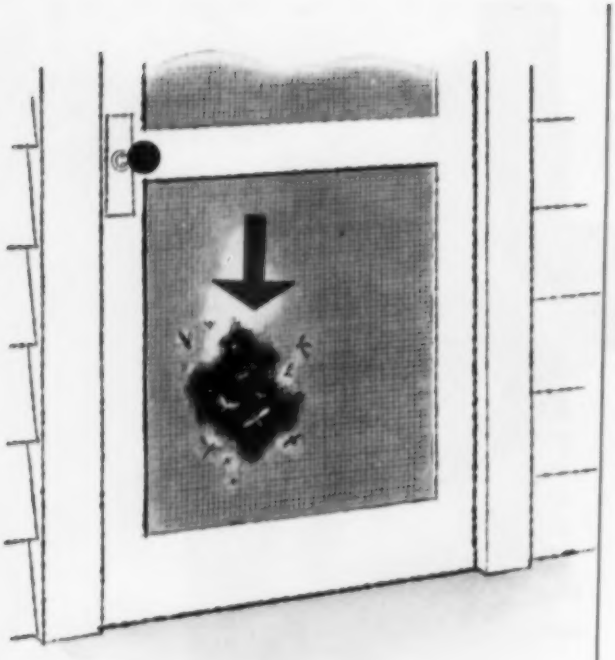
Hydraulic Feeds and speeds, infinitely variable.

Built-in Dividing head with Power Indexing.

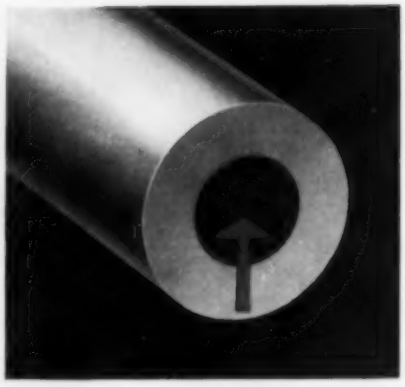
Predetermining counter saves labor in rotary positioning.

**ROCKFORD MACHINE TOOL CO.**
2500 KISHWAUKEE STREET • ROCKFORD, ILLINOIS

**HYDRAULIC**



a hole here is a nuisance...



a hole here is convenient

***Crucible Hollow Tool Steels*** eliminate the nuisance of drilling, boring, cutting-off or rough-facing of ring-shaped, tubular or bored tool steel parts. They save you money, too, by reducing machine time and scrap losses.

Crucible Hollow Tool Steels are produced in all of the famous Crucible tool steel grades . . . in bars or saw cut lengths to meet your needs. And they're available in almost any combination of O.D. and I.D. sizes. You can get these five grades "off the shelf" from your local Crucible warehouse: KETOS oil-hardening . . . SANDERSON water-hardening . . . AIRDI 150 high-carbon, high-chromium . . . AIRKOOL air-hardening . . . NU DIE V hot work.

See how Crucible Hollow Tool Steel Bars will save you hours of shop time. Call your Crucible representative. *Crucible Steel Company of America, The Oliver Bldg., Mellon Square, Pittsburgh 22, Pa.*

**CRUCIBLE** first name in special purpose steels

**Crucible Steel Company of America**

Canadian Distributor — Railway & Power Engineering Corp., Ltd.

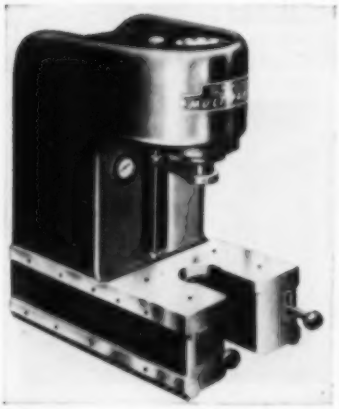
Another production improvement with

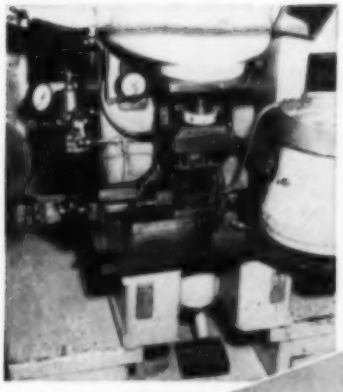
**DENISON**

***MULTIPRESS***

# Multipress® Automation turns out 48,000 assemblies a day

*Denison Multipress pierces, forms, cuts off, positions and spot welds stainless strap to washers*





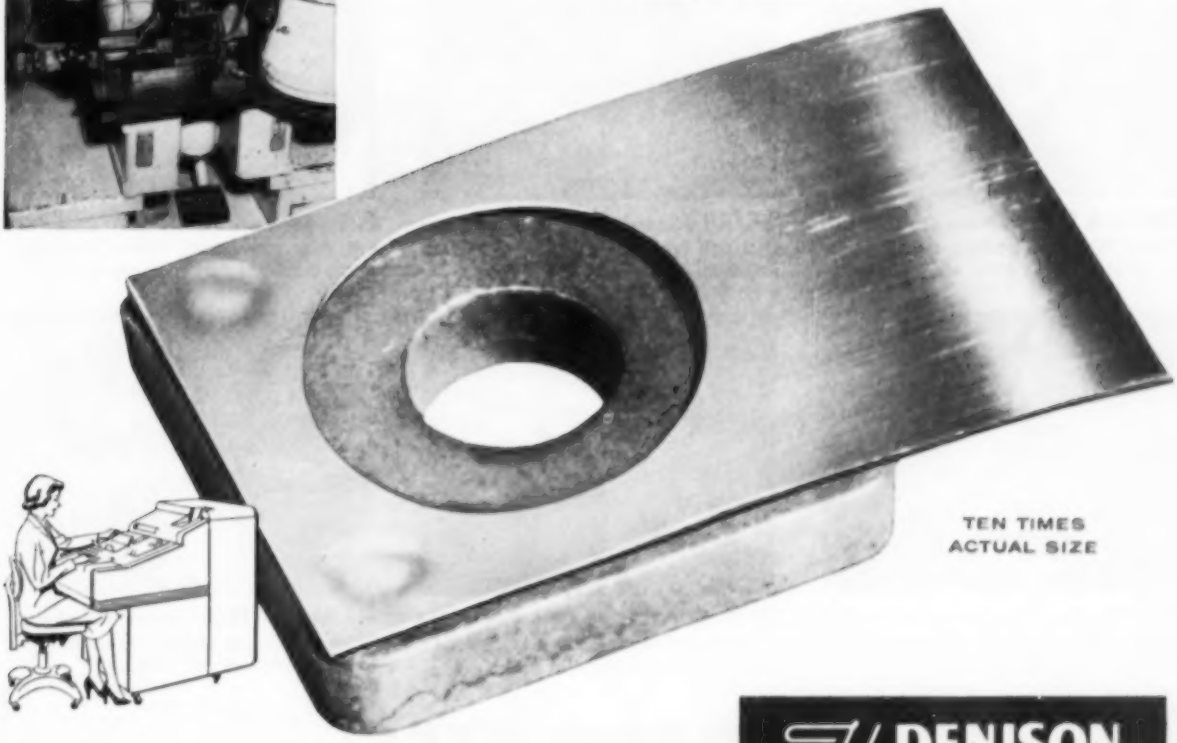
100 assemblies per minute . . . that's the production turned out by one Denison Multipress at International Business Machine Corporation, Poughkeepsie, New York.

Stainless steel tape is fed through a hitch feed into a punch and die set where it is pierced, shaped, and cut off forming a damper guard to cushion the action of a relay armature. It is then positioned under welding electrodes and welded to a square steel washer.

All operations are automatic . . . accurately timed to the stroke of the ram.

Ask a Denison field engineer to show you how to put Multipress to work in your plant. He will demonstrate exactly where and how you can save money on your operations . . . now. Write us.

**THE**
**DENISON ENGINEERING COMPANY**
1180 Dublin Road • Columbus 16, Ohio
*A Subsidiary of American Brake Shoe Co.*



TEN TIMES ACTUAL SIZE

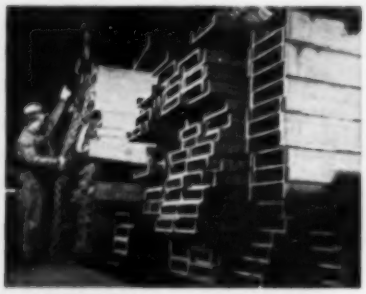
**HYDRAULIC PRESSES • PUMPS • MOTORS • CONTROLS**

**DENISON** HydrOILics

# STEEL BUYERS GUIDE
# to Ryerson Products and Services

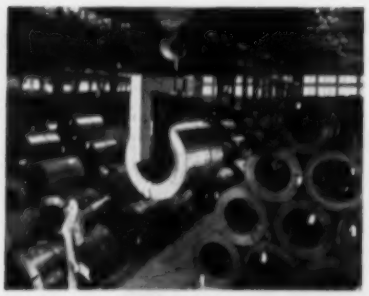
You can draw on your nearby Ryerson plant for an almost endless number of products and services—and the more you concentrate your purchases at one source, the more you save. Ryerson products not pictured here include: Re-bars, expanded metal, grating, plastic pipe, machinery and tools, etc. See your Ryerson catalog for complete list and write for descriptive literature.

**BARS**—The most complete range of types, shapes and sizes as well as the largest tonnage.

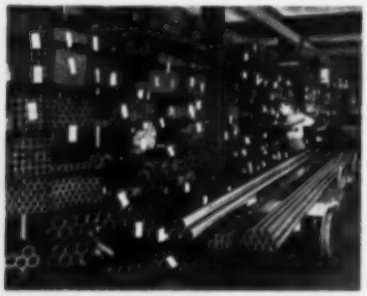


**STRUCTURALS** — I-beams, H-beams, channels, angles, tees and zees—all to ASTM spec. A-7.

**PLATES**—14 types including special low carbon plates for forming and welding, leaded New E-Z-Cut, etc.



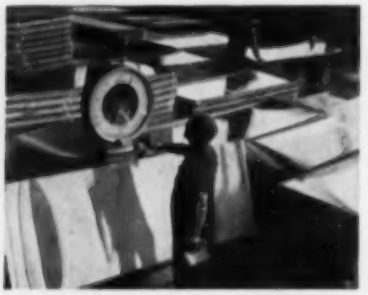
**SHEETS & STRIP**—More than 20 different types in pattern sizes, cut-to-order sizes, strip coils, etc.



**TUBING**—Seamless and welded mechanical tubing, fluid power tubing, structural and boiler tubes, etc.

**C. F. BARS**—Cold finished steel for every use: screw steel, Ledloy, accuracy stock, machinery steel, shafting, etc.

**ALLOYS**—Every type including leaded alloys for fastest machining, all performance-proved by tests.



**STAINLESS**—Allegheny stainless in over 2,221 sizes, shapes, types, finishes: sheets, plates, bars, pipe, etc.

**FLAME CUTTING**—Almost any shape quickly cut from strong rolled steel—one or hundreds all alike.

# RYERSON STEEL

JOSEPH T. RYERSON & SON, INC. PLANTS AT: NEW YORK • BOSTON • WALLINGFORD, CONN. • PHILADELPHIA • CHARLOTTE, N. C. • CINCINNATI
CLEVELAND • DETROIT • PITTSBURGH • BUFFALO • CHICAGO • MILWAUKEE • ST. LOUIS • LOS ANGELES • SAN FRANCISCO • SPOKANE • SEATTLE

STEEL

May 21, 1956

# Metalworking Outlook

## Steel Demands

The across-the-board cost of the week-end premium pay to be demanded by the steelworkers will range from 33 to 40 cents per hour per worker. The cost for workers on continuous jobs will range from 40 to 70 cents per hour. The spread occurs because different steel companies have varying proportions of their operations set up continuously. In announcing that and other demands last week, Steelworker President David McDonald hinted a compromise would be possible on the week-end issue. There will probably be a strike on the matter if he doesn't compromise. No surprises came in the statement on other demands. They'll be for higher wages (no specific amount named), SUB, noncontributory insurance, full union shop, more holidays and vacations and better contract terms.

## Hands Off

A strike in steel could provide the supreme test of the White House's hands-off labor policy. Thus far, the administration has not interfered in three big ones—General Electric Co.'s jet engine plant walkout in 1953, North American Aviation Inc.'s seven-week fracas, Westinghouse Electric Corp.'s 156-day battle. Much more is at stake in the steel situation, but Guy Farmer, former National Labor Relations Board chairman, believes the U.S. will stay out.

## Pressure on Pensions

SUB plans and direct wage costs are of prime concern in your negotiations this year, but don't overlook union pressure on pension changes. You'll encounter some or all of these: Divorcing private pensions from social security, removal of the ceiling on years of service that count toward benefits, elimination of employee contributions, dropping of minimum age for retirement for total disability. Those, particularly removal of the service ceiling, could be expensive.

## Layoff Payments: Small

SUB payments begin June 4 at plants of General Motors Corp., Ford Motor Co. and Chrysler Corp. About 130,000 are idle now, but relatively few will be eligible for payments. To be eligible, a worker's layoff must have occurred since May 1; he must have at least one year's seniority; he must have complied with the unemployment-insurance rules of this state; and he must live in a state which has ruled the plan O.K. Ohio and Virginia have ruled that workers within their boundaries won't get unemployment compensation if they receive company layoff benefits. As of last week, Indiana, Illinois, Missouri and Texas had not approved.

## UE Loses 18,000

The United Electricalworkers got another blow last week. Its District 4, representing 18,000 workers in the metropolitan New York area, will pull out and affiliate with AFL-CIO IUE. The UE was kicked out of the

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CIO in 1949 on the grounds of Communist influence. The IUE was formed by the CIO to take its place and now has more than 350,000 members. The UE claims 200,000, but has less than 100,000.

### Controls for Nickel Alloys?

Look for more nickel-bearing alloys to be included in the Defense Materials System. Office of Defense Mobilization will make an announcement in about a week. The object is tighter control over nickel going for defense projects. The Business & Defense Services Administration would arrange set-asides comparable to those in effect for steel, copper and aluminum.

### Mr. Curtice Revises

Harlow Curtice has revised his estimate of domestic demand for cars downward to 5.8 million for 1956. The General Motors Corp. president's previous estimate, made in January, was 6.5 million domestic passenger car sales this year. He reports truck sales are running at an annual rate of about 950,000, not far from his January prediction of 1 million. He thinks that 1956 will still be the third best year in auto history. Mr. Curtice blames slipping sales on "the restrictive credit policy of the Federal Reserve Board," rumors of revolutionary 1957 cars and predictions of early model introduction dates. He repeats that GM model changes will be evolutionary, not revolutionary, and that 1957 GM models will be out about Nov. 1, plus or minus ten days.

### Another GM Investigation?

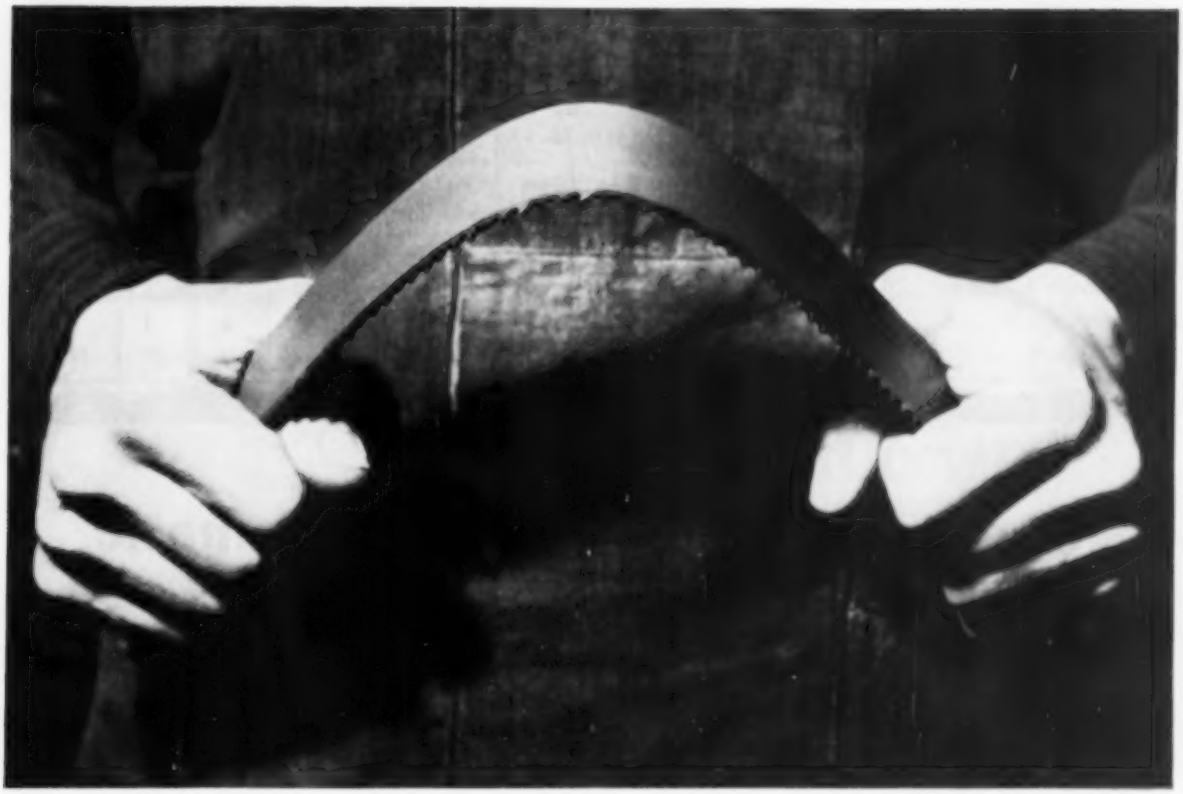
Watch for Sen. Joseph O'Mahoney (Dem., Wyo.) to call for another investigation of General Motors, probably within the next three months and certainly before the year is out. The senator heads a subcommittee of the Senate Committee on the Judiciary.

### Plea on Scrap Exports

Adm. Ben Moreell joins E. T. Weir in a strong plea for congressional action to limit exports of iron and steel scrap. The chairmen of Jones & Laughlin Steel Corp. and National Steel Corp. point out that in 1956 it will be necessary to import about 25 million tons of iron ore. In 1955, about 5 million tons of scrap—equivalent to 9 million tons of ore—were exported. The effect, say the two steel executives, is to cancel out more than one-third of the protection which the steel companies are seeking to give to the deficient raw materials position of the U.S.

### Straws in the Wind

Canadian Javelin Ltd. will sell to British and German firms a minimum of 3 million tons of iron ore a year for 15 years from Newfoundland deposits . . . The United Steelworkers has reached agreement with Reynolds Metals Co. setting up job classifications for 8500 workers, providing a 4-cent increase for each classification; the agreement is similar to that made earlier this year with Aluminum Co. of America . . . No aluminum will go into stockpile in the second half.



# THIS is No Ordinary Power Hack Saw Blade

This is the *unbreakable* MARVEL High-Speed-Edge Hack Saw Blade—the first bi-metal blade—invented, developed and introduced by MARVEL. This blade is a combination of two materials best suited to the requirements of an efficient hack saw blade . . . a narrow high speed steel cutting edge permanently welded to a tough, non-brittle alloy steel body. Each blade is triple tempered to assure long life and maximum toughness to the cutting edge. Development of this high-speed-edge blade made it possible to cut any kind of material from the free machining steels to the toughest of alloys, fast, accurately and economically. Just one type blade to handle any job — no switching blades to cut different materials. Like all good things, attempted copies of this blade have been numerous, but its performance has been *unequalled* by any of the imitators.

The MARVEL high-speed-edge hack saw blade can be tensioned from 200% to 300% tauter than any ordinary hack saw blade, a definite advantage which permits heavier feed pressures to be used without deflection or fear of breakage.

An extremely rugged cutting tool, this one type blade, the MARVEL High-Speed-Edge Hack Saw Blade, will cut any machineable metal with outstanding economy, accuracy, long life and complete safety—*it is unbreakable.*

Ask for MARVEL Blades by name and you can be sure you're getting the best on the market. Leading Industrial Distributors have them in stock.

8-1120

*Write for latest cutting tool Bulletin and the name of your nearest MARVEL Distributor*

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## Typical Mechanical Properties of Ni-Vee Bronzes

| TYPE | A (lead free) | | | B (1% lead | | C (5% lead) | | D (10% lead) | | E (20% lead) | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | As Cast | Tempered | Heat-Treated | As Cast | Tempered | As Cast | Tempered | As Cast | Tempered | As Cast | Tempered |
| Tensile Strength (thousand psi).... | 50 | 65 | 85 | 45 | 60 | 40 | 50 | 35 | 40 | 25 | 30 |
| Yield Strength (thousand psi)..... | 22 | 40 | 55 | 20 | 30 | 20 | 30 | 20 | 25 | 18 | 22 |
| Elongation, % in 2".....| 40 | 10 | 10 | 30 | 8 | 15 | 5 | 10 | 2 | 5 | 2 |
| Brinell Hardness..... | 85 | 130 | 180 | 80 | 120 | 80 | 130 | 80 | 110 | 70 | 80 |

# Specifying is simple and systematic with 5 versatile Ni-Vee Bronzes

Now . . . designers and engineers can readily select a suitable bronze for any specific need . . . from only five Ni-Vee* bronzes.

*"As Cast,"* these five Ni-Vee bronzes provide mechanical properties that surpass those of comparable G bronze, red brasses and leaded bearing bronzes. What's more, their superior properties can be still further elevated by simple heat-treatments.

*Basically, each Ni-Vee bronze contains 5% nickel and 5% tin,* from 0 up to 20% of lead. Tensile strength ranges from 25 to 85 thousand psi, and hardness from 70 to 180 Brinell.

### Advantages

*Just five of these Ni-Vee bronzes make it possible to standardize metal inventories, melting practices and shop operation . . . as well as specification . . . to meet many industrial uses for copper-base castings.*

Each Ni-Vee bronze contains an optimum nickel content to raise levels of strength, hardness and toughness. In addition, this nickel content provides a high degree of corrosion resistance in the Ni-Vee bronzes. Negligible zinc content makes it free from dezincification. This spells resistance to stress-corrosion attack.

### A versatile family

Copper-base alloys are ordinarily used for the three types of castings listed below. For each of these applications a Ni-Vee bronze provides particular advantages:

(1) **Constructional** castings – high strength
(2) **Pressure** castings – fine grain
(3) **Bearing** castings – resistance to wear and seizure

*The simple family of five Ni-Vee bronzes actually replaces the confusing variety of miscellaneous bronzes.* As a result, engineers and designers can now specify simply and systematically . . . specify Ni-Vee bronzes wherever possible. Parts cast in Ni-Vee bronze already serve *electrical, power, steel, petroleum, chemical, automotive, aircraft, railroad and other industries.*

### Engineering data for you

*Learn how the Ni-Vee bronzes can simplify your specification work,* improve product performance. Send for a copy of *"Engineering Properties and Applications of Ni-Vee Bronzes."* It contains useful information like that given in the table above: tables of composition, charts on deformation, friction, fatigue, elevated temperature service, electrical resistivity, wear and other engineering data. *Write for it now.*

*Registered trademark

INCO TRADE MARK

**THE INTERNATIONAL NICKEL COMPANY, INC.** 67 Wall Street New York 5, N.Y.

# Please the Customer

When General Motors dedicated its gigantic new technical center near Detroit last week, it really was dedicating a $100-million investment to please customers.

More than 4000 scientists, engineers, designers and technicians already are at work in the center. Their projects range all the way from pure science and basic research to advanced engineering, future styling and improved manufacturing methods.

The engine in the car of the near future may have a die-cast aluminum block and cylinder heads as a logical extension of the change that already has taken place in automatic transmission housings. The car of the more distant future may be driven by a gas turbine supplied with power from a free piston gasifier. One of these turbines is already in GM's experimental XP-500.

The time is not far off when auto bodies will be assembled automatically. So will auto engines. In time, all assembly operations will be automated.

Screw machine products will be replaced with cold-headed and cold-extruded parts, crankshafts with shell moldings of pearlitic malleable or ductile iron. Threads and gear teeth will be rolled rather than machined.

In handling enormous amounts of material in process, mechanical stackers will be used for small parts, overhead storage conveyors for large parts.

This vast amount of energy is being poured into development work to please the man who drives an automobile. The auto industry in less than half a century has witnessed the introduction of 2700 different makes. Less than two score survive. As President Harlow C. Curtice of General Motors analyzes it, others faded into limbo because they failed to have appeal for one person—the customer.

Whether you sell autos or air conditioners, hydraulic systems or machine tools, aluminum or steel, you also have the problem of pleasing customers.

Irwin H. Such

EDITOR-IN-CHIEF

## WHEN MIGHTHOOD WAS IN FLOWER

From the time of the Pyramids until just recently, heavy construction required "gangs" of men. Today, giant machines supply most of the muscle. In our lifetime, an aggressive construction industry has astounded the nation with its everyday miracles. Steel has played its part by developing better-forming, higher strength steels that have resulted in roads, bridges and buildings that last longer, look better and perform more efficiently. These same steels have also helped make possible the modern tools that dig and pound, lift and haul. An important job at Inland is supplying the *right* steels for building and for the tools of building.

**INLAND STEEL COMPANY** *38 South Dearborn Street, Chicago 3, Illinois. Sales Offices: Chicago, Milwaukee, St. Paul, Davenport, St. Louis, Kansas City, Indianapolis, Detroit, New York. Steel products supplied to the construction industry include plates, structural shapes, 4-Way safety plate, piling, Ti-Co galvanized sheets, Hi-Bond reinforcing bars, sub-purlins. Other products: hot and cold rolled sheets and strip, tin mill products, rail and track accessories, coal chemicals.*

Finished steel price index, from U. S. Bureau of Labor Statistics, 1947-1949 = 100
Steelworker earnings index computed by STEEL from American Iron & Steel Institute figures, 1947-1949 = 100

# Steel Price Hike Weighed

**The problem is: How much of an increase? Producers face need to cover coming wage boosts and to obtain money for plant replacement and expansion**

THE main question about a steel price rise is: "How much?"

Mills will face increased employment costs at the close of negotiations for a new labor contract to replace the current one which expires June 30. Will they merely try to cover increases in employment costs? Or will they add on something to help pay the increased costs of plant replacement and expansion?

Executives of several steel companies have for months been beating the drums for price increases sufficient to pay the rising costs of plant replacement and expansion. They would raise prices if they were sure the largest producer, U. S. Steel Corp., would do likewise. Smaller companies point out they aren't big enough to set price policies. They feel they have to wait until U. S. Steel makes a move; then they can follow. U. S. Steel, with 30.5 per cent of the nation's steel ingot capacity, has not seen fit to make substantial, across-the-board price increases.

**Selective** — The corporation, though, has been initiating selective increases—principally in price extras.

At the conclusion of wage negotiations last July, the steel industry made an across-the-board increase in base prices. The boost, measured by STEEL's arithmetical price composite, averaged $6.14 a net ton, or 5.1 per cent. The wage increase then was 15.2 cents an hour. For every cent of wage increase there was a 40-cent-a-ton rise in steel prices. On that basis, a 20-cent-an-hour increase this summer in employment costs (see STEEL, May 14, p. 67) would hoist steel prices $8 a ton.

Steel prices, measured by the finished steel price index of the U. S. Bureau of Labor Statistics, have risen more sharply than the bureau's all-commodity wholesale price index in the last nine years, but steel executives declare steel was underpriced to begin with.

**Wages Lead**—Even though steel prices have been raised, they have lagged behind steelworkers' wages, as the chart on this page shows.

STEEL said (Nov. 14, 1955, p. 59) steel prices might go up $12 a ton by next July. Prices have risen since then, mainly in extras, by about $2.75 a ton. To total $12, there would have to be an additional $9.25 increase. If employment costs rise $8 a ton at midyear, $1.25 would be left to help bring steel company earnings up to where industry leaders say they should be. But $1.25 would be far below the $12-to-$15-a-ton increase which Avery C. Adams, president of Pittsburgh Steel Co., called for in addressing the New York Society of Security Analysts. A $12-to-$15 increase is necessary, he says, to: 1. Bring the steel industry's return on investment to a level equal to that of leading companies in other industries (see table on page 70). 2. Help defray current inflated costs of expansion.

**Common Hurdle** — In speaking before that New York group, Ernest T. Weir, chairman of National Steel Corp., pointed out that his company, after its present expansion program is completed, will have to build a new plant which will cost at least $650 million. "Where do we get this enormous amount of money? Not a single steel company—certainly not within the independent group—can do this financing on the basis of present earnings and the dividends being paid," Mr. Weir asserts.

"National Steel certainly cannot go out on the market and finance the full sum of $650 million. I have gone into this matter thoroughly with our financial advisers. The best we could expect to do through the sale of securities to the public would be to raise $400 million. This means that when we start building the plant we must have accumulated against this project the sum of $250 million in cash or equivalent. On this basis,

## Steel Industry: A Low Man on Totem Pole

(per cent of profit on sales)

| Industrial groups | 1955 | 1954 | 1953 | 1952 | 1951 | 1950 | 1949 | 1948 | 1947 |
|---|---|---|---|---|---|---|---|---|---|
| Cement | 16.5 | 15.3 | 12.3 | 11.9 | 11.8 | 15.4 | 15.8 | 14.0 | 11.5 |
| Petroleum products and refining | 10.6 | 10.7 | 10.6 | 10.5 | 11.5 | 11.2 | 9.9 | 12.9 | 11.1 |
| Chemical products | 10.0 | 8.9 | 7.6 | 7.7 | 9.9 | 11.7 | 10.3 | 9.9 | 9.6 |
| Nonferrous metals | 9.5 | 7.3 | 6.9 | 7.7 | 8.8 | 9.8 | 8.2 | 11.7 | 12.4 |
| Glass products | 9.0 | 7.9 | 6.8 | 7.1 | 6.8 | 10.9 | 9.9 | 7.8 | 8.2 |
| Iron and steel | 7.8 | 6.0 | 5.7 | 5.0 | 5.8 | 8.1 | 7.2 | 6.7 | 6.2 |

Source: First National City Bank of New York.

Mr. Weir explains, it is necessary to accumulate out of earnings an average of $50 million per year over the next five years.

"This simply cannot be done on the present earnings basis. And I want to emphasize that National Steel does not stand alone in this situation."

**Prices Must Rise**—"There is one answer and one only," Mr. Weir exclaims: "The selling price of steel must be advanced materially."

Russell L. Peters, chairman of the finance committee and financial vice president of Inland Steel Co., told the St. Louis Society of Financial Analysts that if the required expansion in the steel industry is to be provided when it is needed, the industry must be able to sell its securities on a realistic basis, and the necessary funds from the investing public must be forthcoming. Earnings must be raised to a level which will make steel stocks attractive to investors, he declares.

**Low Earner** — "Traditionally, steel stocks have not been highly regarded by the financial community. The industry has not earned satisfactory profits for the last 30 years, although at the moment, because of the extremely high level of operations, earnings have improved. Statistics maintained by the First National City Bank of New York over the years show that in the last 30 years, steel has ranked no higher than twenty-fifth, when compared with 41 other industries; and in 1954 ranked thirty-second," Mr. Peters pointed out.

"The steel companies have concentrated their efforts in reducing costs and in taking full advantage of technological improvements and these efforts, of course, must continue. But this is not enough. The present price structure is not high enough to support production based on present day costs. A price level which will encourage new investment and which will make available the funds needed for new capacities is imperative."

**Inadequate Depreciation** — "It might be argued," Mr. Peters says, "that retained earnings can be applied to provide substantial funds for expansion. This concept, however, overlooks an important factor which has not been given due consideration. The preservation of existing capacities and the replacement of worn-out and depreciated equipment are just as important in the future production of steel as is further expansion. The funds available from depreciation allowances at the present time are far from adequate for the purpose of replacing existing equipment as it wears out. Retained earnings must be applied, first of all, to the preservation of what we have — for the replacement of facilities that are wearing out, and only the amount left over, if any, can be considered available for expansion."

**"Last Resort"** — At the 1956 meeting of stockholders, Roger M. Blough, chairman of U. S. Steel Corp., said the "last resort" in obtaining necessary funds for plant replacement and expansion "is by raising prices from time to time in this highly competitive industry as circumstances require and permit. In the absence of a more realistic treatment of depreciation there simply is no other course."

If it takes $8 a ton to cover the coming wage negotiations and $12 to $15 a ton to cover plant replacement and expansion, a price increase of $20 to $23 a ton (a 16-to-19-per-cent rise) would be needed. Can the steel industry ask for all or only part of it? That is the problem now weighing upon the industry. (Washington's reaction on page 76).

*• An extra copy of this article is available until supply is exhausted. Write Editorial Service, STEEL, Penton Bldg., Cleveland 13, O.*

### French Prices Rise, Too

French steel prices are headed upward, too.

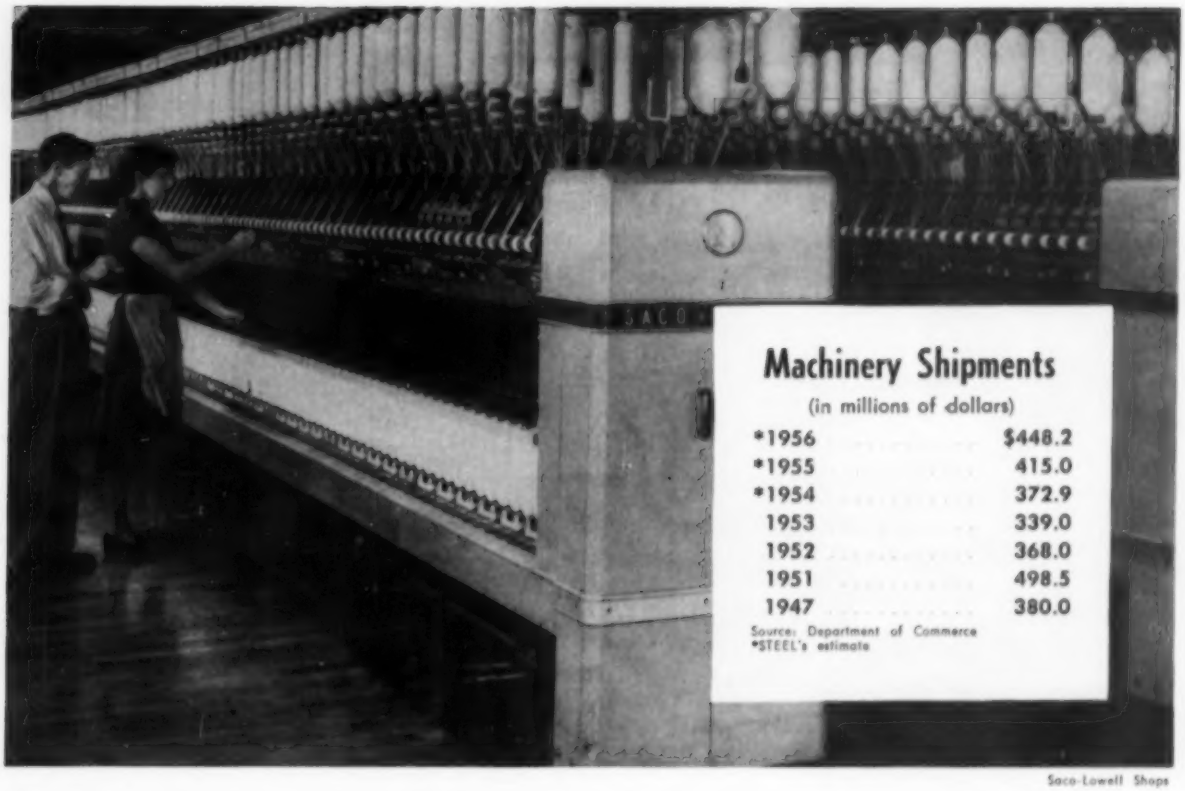
Steelmakers will soon ask Luxembourg (headquarters of the European Coal & Steel Community) to approve a hike that would average 4 per cent over all products. Span will be from 2.5 per cent on plate and sheet to some 7 per cent on structurals.

Mills are facing stiff opposition from the French government. Like most of West Europe, France is having a tough time keeping inflation in check. But, under terms of the Schuman Plan, Paris has no control over steel. Opinion is that the increase will go through.

It's assured a good reception from ECSC. Members agree that it's healthy for steel prices to climb as demand rises. Recently, a 5-per-cent boost went through in England.

Demand for higher prices in France closely parallels the situation here. Raw materials and labor costs are up. But the big reason is that present earnings are not high enough to finance expansion.

Steelmakers plan to spend 77 billion francs for new plant this year. At current rates, earnings will only cover 55 billion of this. Further borrowing can't fill all the gap. The mills figure that a 4-per-cent hike would net them an additional 15 billion to 18 billion francs over a full year.



**Machinery Shipments**

(in millions of dollars)

| | |
|---|---|
| *1956 | $448.2 |
| *1955 | 415.0 |
| *1954 | 372.9 |
| 1953 | 339.0 |
| 1952 | 368.0 |
| 1951 | 498.5 |
| 1947 | 380.0 |

Source: Department of Commerce
*STEEL's estimate

Saco-Lowell Shops

# Textile Mills Modernize

**Machinery makers are forecasting a 5 to 10 per cent sales increase this year. They're reaping the benefits of rougher competition among textile producers**

AN INCREASE in new machinery orders is disproving theories that it would take the textile industry 40 years to re-equip itself. Mild, but steady gains through 1954, and a substantial upturn since the middle of 1955, show that cloth and fabric mills are alerted to the need for modernization.

Machinery builders report backlogs of six to eight months. Sales, including parts and attachments, are running 8 per cent ahead of 1955's.

**Obsolescent** — Of 22 million spindles in place, only 1 million have been bought since 1952. Of 91,000 carding units, 75,000 are 25 years old or more. For many textile machinery makers modernization means survival.

Says W. Frank Lowell, Saco-Lowell: "Textile machinery builders are more aware than ever that machines must be capable of producing more goods per hour at a lower cost, and, at the same time, maintain ever higher quality."

**Index**—Steel and metal consumption by the machinery makers, including iron castings, is at a rate of 285,000 tons a year. Design changes since World War II tend toward the use of more steel and aluminum extrusions and other built-up metal shapes at the expense of iron castings.

The foundry melt still reflects trends. Iron pourings of five major machinery builders declined in 1952-1954 from 2400 tons a week to 1200 tons. By August, 1955, the 2400-ton week was again reached.

**Capacity**—When the 1952 recession hit, several of the largest shops had just completed pushbutton foundry installations which doubled capacity. This increased capacity has never been utilized, although several firms are booking substantial orders for outside castings, including ductile iron.

Loom builders' backlogs are being helped by the strong demand from the paper industry. Crompton & Knowles Loom Works, Worcester, Mass., reports: "We are sold months ahead into 1957 on felt looms, partly because of heavy demand from paper."

**Going South**—Although the bulk of textile mill machinery is still produced in New England, there's a steady southward movement: Branch offices, assembly lines and service installations all figure in the trend. Of 52 member companies of the American Textile Machinery Association, 23 have plants in the South to service equipment with close-at-hand parts and attachments.

Plastic pipe for chemical plants and steel mills. With a diameter of 12 in., it's the biggest rigid polyvinyl chloride (PVC) pipe ever extruded commercially in the U. S., says Colonial Plastics Mfg. Co., Cleveland

# Plastic Pipe Is Growing Up

**It has all the problems any infant industry has, but the signs all indicate: Standards are coming; quality and prices are being stabilized; sales will double by 1960**

THE ENTRY of steelmakers into plastics is beginning to look like an invasion. Take plastic pipe:

**Line-Up**—These firms are buying the raw material from large chemical companies and converting it into pipe: Republic Steel Corp., Youngstown Sheet & Tube Co. and National Tube Division, U. S. Steel Corp. Youngstown Sheet & Tube has curtailed commercial production and is experimenting with a new resin.

Carpenter Steel Co.'s Alloy Tube Division is buying the pipe ready-made from Alpha Plastics Inc. and distributing it (since February) through its regular steel pipe channels. Carpenter has received a "flood of inquiries" about plastic pipe, a company spokesman reports.

Other metalworking firms are either making it or distributing it, or both: Mueller Brass Co.; Van Dorn Iron Works Co.; Triangle Conduit & Cable Co.; Spang-Chalfant Division, National Supply Co.; Tube Turns Division, National Cylinder Gas Co.; Crane Co.; and Joseph T. Ryerson & Son Inc.

**Applications**—Plastics Division, Monsanto Chemical Co., guesses that plastic pipe can share a maximum of 15 per cent of the present metal pipe market.

That seems to be sufficient reason for the steelmakers' interest.

Other sources estimate an even larger market. One chemical firm thinks 85 per cent of the chemical industry's pipe installations are within the limitations of plastic. Another expert suggests that plastic could take over 90 per cent of all industry's stainless pipe installations which fall within plastic pipe's working temperature.

Potentially the largest users of plastic pipe, says Monsanto, are: Petroleum, sewerage and waste disposal, gas and water utilities. Those three groups each could eventually require 60 million lb of plastic pipe a year.

**Competition** — Says one steel spokesman: "Plastic pipe is going to be sold. We might as well be the ones to do it; we already have the logical distributors set up in our steel pipe sales."

Copper and aluminum pipe have felt plastic competition much more than steel. In many ways, says George Anderson, assistant manager, planning and development, National Tube, the plastic pipe

market has been self-made, particularly in cold water movement.

Besides developing competition between plastic and metal pipe, there's plenty of competition between plastic pipe producers. George H. Reed, plastics manager, American Hard Rubber Co., reports a trend to greater stability in the industry since larger firms have entered the business, but the struggle for maturity is by no means over.

"We have retrenched temporarily from the plastic pipe business until such time as the industry is stabilized, both pricewise and quality-wise," reports an eastern firm.

**Standards**—To create confidence in commercial users and the general public, a strong effort is being made to establish standards for the young industry. William Hatfield, sales manager, Industrial Division, Colonial Plastics Mfg. Co., warns that defective products are dangerous for the entire industry.

Society of the Plastics Industry Inc. has spent $125,000 on research at Battelle Memorial Institute, and work will continue through 1957 at least. The classes of pipe being tested: Polyethylene, styrene copolymer, butyrate and polyvinyl chloride.

**Look Ahead**—Polyethylene now holds about 80 per cent of the market. Polyvinyl chloride and Kralastic will increase their share of the market heavily in the next few years. "There are new products coming along all the time, and we're watching them," says Republic. That seems to be the attitude that's paying off for the entire industry.

Latest developments: Youngstown Sheet & Tube's work with an epoxy resin; Phillips Chemical Co.'s stronger polyethylene.

## GM Gets Fast Tax Write-Off

The Office of Defense Mobilization issued certificates of necessity for fast tax write-offs amounting to $124 million from Apr. 19 to May 2. Metalworking projects of $1 million or more included: $14 million for research by General Motors Corp.; five orders for military aircraft, parts and engines; six orders for diesel locomotives; and three oil pipe lines.

*Many firms liberalize policies to grant . . .*

# Longer Vacations in '56

LOOK for more fishing and golfing this summer. Vacations are getting longer. The shift to a three-week vacation for 15 years of service is nearly complete.

As recently as 1950, a survey of Associated Industries of Cleveland showed only 20 companies giving a three-week vacation for 15 years of service; this year 148 will. About 87 per cent of the employees come under such plans.

Vacation policies are fast changing. The Cleveland survey finds that more than 150 different formulas are used by one or more of its members for computing vacations which range from 1 to 25 days.

**An Extra**—About 25 per cent of the workers get 2½-week vacations after ten years. An equal percentage get 1½-weeks for three years. The trend to longer vacations is accented in Detroit. A survey of the Employers Association there shows that 45 of 153 firms give more than two-week vacations for over ten but less than 15 years of service. Of these firms, 23 gave three-week vacations.

The United Steelworkers says contracts have been signed in the can industry for four-week vacations. Service time required is generally 20 or 25 years.

**Honk, Honk**—The busy season on the vacation roads will be July. The Tristate Industrial Association, Pittsburgh, recommends avoiding the early July vacation rush as it did last year when its warnings helped avert the log jam that can be caused by wholesale plant shutdowns. In Cleveland, plant-wide vacations will be most common through July and the first week of August.

**Tough Decision** — Whether to stagger vacations or close the plant is furrowing the brow of many an executive in this year of high production. Foundries would prefer to shut down for vacations. They need the time to do maintenance. But backlogs and customer pressure will prevent a shutdown resembling that of two years ago.

Arthur B. Davies, executive director of Smaller Manufacturers Council, Pittsburgh, says only about 10 of its 500 members will shut down completely for two weeks. Last year, nearly 40 per cent of the shops surveyed in Chicago closed for vacations. Don Porter of the Employers Association of Detroit finds that few companies there shut down completely for vacations. In Cleveland, about 70 per cent of the plants surveyed say they will close this year.

NEA

## Steel Expands South of the Border

| | PRODUCTION* | | | CAPACITY* | |
|---|---|---|---|---|---|
| | 1955 | 1954 | 1953 | 1960 | 1955 |
| Argentina | 233 | 165 | 165 | 1,250 | 260 |
| Brazil | 1,274 | 1,275 | 1,075 | 2,200 | 1,435 |
| Chile | 360 | 380 | 378 | 440 | 440 |
| Colombia | 78 | 50 | 10 | 275 | 220 |
| Mexico | 812 | 710 | 468 | 1,940 | 1,225 |
| Peru | 10 | 10 | 10 | 65 | 65 |
| Uruguay | 10 | 10 | 10 | 50 | 50 |
| Venezuela | 15 | 15 | 15 | 465 | 20 |
| Total | 2,792 | 2,615 | 2,131 | 6,685 | 3,715 |

*1000 net tons. Source: Commerce department

# Latins Boost Steel Output

**Harassed by persistent dollar shortages, South American countries seek less dependence on imports. But demand is likely to outrun even expanded capacity**

STEEL production in Latin America will just about double by 1960 (see table).

Even so, production will still be less than 2 per cent of world capacity, which means south of the border countries will still be a willing market for U. S. producers. Last year, about 14 per cent (tonnagewise) and 20 per cent (dollarwise) of U. S. exports of iron and steel mill products went that way.

**Build-Up**—Outlook is for a continuing increase as Latin America builds itself up.

The dollar shortage is one of the problems, both in building new capacity and in importing steel. It could hold up some building plans. Another effect of the dollar shortage is the awarding of construction jobs to European firms, notably German, French and Italian. Easier credit also plays a part in some of the awards.

**Argentina** is one of the countries with a dollar problem, but American-built equipment does figure in expansion plans; so does European. A second problem Argentina has: Except for some local scrap, most raw material will have to be imported.

**Brazil,** from the standpoint of material supply, has the potential to become South America's largest steel producer. Plans are to increase the Volta Redonda mill of Brazilian National Steel Co. from its present 700,000 ingot tons a year to 1 million tons. Financing has been arranged through the Export-Import Bank, which means equipment will be bought in the U. S.

Plans call for building three subsidiary mills elsewhere in Brazil. Expansion and diversification of the product mix at several other plants are in the works.

**Colombia's** 165,000 - ton integrated mill came into operation in December, 1954; further expansion of both ingot and finishing capacity is planned.

**Chile's** present plans revolve mostly around additional finishing capacity.

**Mexico** is undertaking a double-barreled expansion of both steelmaking and finishing capacity. A 165,000-metric-ton plant for the West Coast has been announced. Plans to expand two integrated plants are in various stages of completion. Scrap will probably continue to be imported in good quantities because no general program of blast furnace construction is reported.

**Peru** is building a 65,000-ton electric integrated steel plant at Chimbote. French designed and financed, the plant is close to completion.

**Venezuela** plans to build a $173-million integrated plant at Puerto Ordaz. Initial capacity will be 300,000 tons; a second expansion step will boost it to 421,500 tons. Bars and shapes will be the first finished products.

Operations are expected to begin in early 1958 and full production in 1959. Cerro Bolivar ore will be used. Two Italian firms are doing the building.

Even when the mill hits full production, it won't come close to filling Venezuela's steel needs, cur-

rently about 600,000 tons a year, compared with only 43,000 tons in 1953. Urgently needed are rails for the 2640-mile net of national railroads and other construction.

### Strike Hits Fabricators

With the strike at Tennessee Coal & Iron Division of U. S. Steel Corp., Birmingham, going into its fourth week, local fabricators are forced to slow down production.

Robert I. Ingalls, president, Ingalls Iron Works, says his company has already cut back and laid off some men. Unless steel supplies are resumed soon, he adds, a bigger cut will have to be made. Other TCI customers concur. Few have more than a 30-day steel supply. Pullman-Standard Car Mfg. Co. is laying off workers. O'Neal Steel Co. dropped half its men and reduced the work week to four days for those retained.

Arthur V. Wiebel, TCI president, estimates that strikers are losing $2.5 million in wages and that the company is losing 70,000 tons of steel production a week. The strike started when 250 members of the Brotherhood of Locomotive Engineers & Firemen broke off contract negotiations over a wage dispute. Striking railmen want an increase of 37 cents an hour.

### Copper Stocks Grow

World refined copper stocks jumped from 225,827 tons at the end of March to 238,125 tons on the last day of April, reports the Copper Institute, New York. World refined production in April reached 254,462 tons, 4000 tons under the peak March total. While deliveries to U. S. fabricators dropped only slightly (April, 139,927 tons; March, 141,590 tons), foreign deliveries fell from 120,224 tons in March to 102,317 tons in April.

The General Services Administration plans to negotiate with contractors for the delivery of some 40,000 tons of the red metal which has been deferred to industry. It proposes that 18,800 tons be delivered to stockpile in the third and fourth quarters of this year. In 1957, first quarter stockpiling would be 9800 tons; second quarter, 6200; third quarter, 2300; and fourth quarter, 1900.

## New Code for Steel

**Ryerson says its color code lessens chances of mix-up when using carbon and alloy steels**

STEEL SHIPPED since May 14 by Joseph T. Ryerson & Son Inc., Chicago, uses a new color identification system. Until users learn the system, shipments will be tagged.

W. E. Falberg, Ryerson's general sales manager, calls the system "both logical and meaningful in its use of colors," and reports it can be expanded to include new steels.

**Key**—Each color used has a definite meaning: Single colors identify standard carbon and carbon manganese steels. Green, blue, yellow and pink define carbon content (centered dots of those colors mean the steel was heat treated).

Centered dots identify other characteristics. Purple, black, white, orange, gold and brown designate related groups of steels. Red, in any form, means special ground finish.

An explanatory pocket-sized card is available.

**No Changes**—The most widely used carbon steels continue to be marked with the old colors under the new system. Green is still used for C1018 and C1020 carbon steel bars. Blue identifies C1035; yellow identifies C1042 and C1045.

Alloy steels are usually designated with two colors, one for the analysis group and one for the carbon content.

Except for tool steel bars (which are painted full length), colors for bar stock are painted on one end. Bar stock should always be cut from the end that does not carry the color marks.

### Need More Coal Research

In the next 20 years U. S. requirements for energy will increase by two-thirds, says the Department of the Interior. Bureau of Mines and Bituminous Coal Research Inc. (an industry-supported group) are urging a big research program for bituminous coal, so that the industry will be ready to share in the increased demands.

More than 200 possibilities for research are listed in a recent Bureau of Mines report. "Much of this program must be started now," the report says, "if the technology is to be available when needed." About $17 million was spent in 1955 on coal research, compared with $146 million spent on petroleum studies.

### GE Engineers Have Pipe Movies

How to check for damage inside aluminum tubes which hold uranium fuel: General Electric Co. engineers attached a telescope (with a wide angle lens at the far end and additional lenses along its length) to a movie camera. The telescope is moved through the aluminum tube

# Steel Prices Questioned

**A Senate committee has been studying the need for an investigation. Now pressure from labor and other groups is forcing the issue in time for the elections**

THERE'S a good chance Congress will take a look at steel prices in July or this fall (see page 69).

Sen. Paul Douglas' (Dem., Ill.) Joint Economic Committee staff has been gathering material for about a year to see if such an inquiry would be "fruitful." Evidently that stage, for one reason or another, is approaching.

**Scholarship** — Grover Ensley, committee staff director, says that what was originally in mind was a scholarly review of the wage-price-profit picture to find out if there are unseen or emerging maladjustments in the economy. So the inquiry might have been held regardless of this year's steel labor negotiations and elections.

**Undertones** — Political undertones can't be overlooked. There is the "Big Business" issue, for one. Union pressures are another; the United Auto Workers International Executive Board and Walter Reuther himself have asked several times for a congressional investigation into steel prices: "So that responsibility for the profiteering price gouge of the American public can be placed where it belongs and an inflationary spiral checked."

Other topics to be looked at: 1. If the steel industry can "arbitrarily" raise prices, is there really competition in the industry? 2. Why can't steel go out and borrow money for expansion like other industries? 3. What's happening to unit labor costs? 4. Are there maladjustments in prices and wages?

**Extremists**—Probably also to be expected are cries by extremists that steel is a public utility or a monopoly and should be regulated as such.

Then there is the question: What happens if it should be determined that wages, prices or profits are out of line?

About all that is ventured in that direction now is that there will be some kind of appeal to the "statesmanship" of the parties concerned to make appropriate adjustments.

A fall date for the study would bring the issue to the front right about election time.

## FRB Sticks to Its Guns

The Federal Reserve Board is catching the blame for the comparatively slow rate of housing starts this year (about 1.1 million at the seasonally adjusted annual rate, compared with last year's 1.4-million rate at this time).

**Charges** — Rep. Albert Rains (Dem., Ala.), chairman of House Banking & Currency housing subcommittee, charges the latest FRB increases in the rediscount rate came at a time when the mortgage market situation was "already plagued by abusive and excessive discounts and by shortages of funds in many areas."

And, he predicts, that housing starts won't hit the administration's goal of 1.3 million in 1956, a goal reiterated just a few weeks ago by Housing Administrator Albert M. Cole. Some sources view Mr. Cole's estimate as "away out of line." And there are signs that Mr. Cole himself is going to take a new look at the situation.

In the housing industry, the National Association of Home Builders believes the FRB action is having a decidedly bad effect, though it's still holding to its first-of-the-year estimate of 1.15 million to 1.2 million starts this year.

**Danger** — The Federal Reserve Board (in spite of the hullabaloo, Congressional and industrywise) seems to be sticking to its guns—that inflation is a greater danger than is tighter credit.

Perhaps the best news is the fourth straight monthly rise in appraisal requests at the Veterans Administration. Requests in April topped 80,000, nearly 18 per cent above March and the highest since last August. Appraisal requests for proposed homes were up 22 per cent.

*Meet Eger V. Murphree*: He's heading up the Defense department's guided missile program. Mr. Murphree is president of Esso Research & Engineering Co. (formerly Standard Oil Development Co.). During World War II, he was a member of the Office of Scientific Research & Development S-1 Committee (the Manhattan atomic bomb project).

## CAA Looks Ahead to 1965

Civil Aeronautics Administration experts took a look at 1965. They saw:

Atomic power plants for civilian aircraft on the drawing boards. Vertical take - off and landing (VTOL) and short take-off and landing (STOL) aircraft moving into civilian aviation. An electronics boom as radar and automatic data processing take over air traffic control. Long-range flights may be guided along preselected flight paths and altitudes by punch-card Automatic Flight Control (models of that have already been developed).

Airport construction will surge. Airports will number in the tens of thousands instead of today's 7000.

# in 12.6 seconds— induction hardened

## by Cincinnati

*Now Cincinnati does both . . . flame and induction hardening . . . with a high degree of proficiency.*

The work shown at left is indicative of the kind of performance you can expect from new Cincinnati Induction Hardening Machines. On the job in a fully automated installation, the machine illustrated below hardens two areas of this hollow turbine shaft to Rockwell C 60, .025" case depth, at the rate of 200 shafts per 42-minute hour.

Yet, the design of these machines makes them equally efficient for varied, low-production operations using manual control.

These are high frequency machines, operating at 1200 to 1400 kc/sec., for *rapid* selective hardening of small diameter or thin walled parts and those requiring a shallow case. High frequencies with maximum power density produce minimum case depth in minimum time, with little or no distortion and scale.

For full information on new Cincinnati Induction Hardening Machines, write for Bulletin M-1938. Better still, call in a Process Machinery Division field engineer. Let him brief you on their many outstanding advantages.

New Cincinnati 30 KW Induction Hardening Machine equipped with automatic controls and work handling system for selective hardening of the turbine shaft shown above. Also made in 15 KW capacity.

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# Keeps Working Parts **WORKING**

**How 3 Different Types of Stainless Steel from the HOUSE of STAINLESS Contribute to "BUCCANEER" Performance in Fresh or Salt Water.**

**THE NEED**—When Gale Products designed the Buccaneer, they knew that this outboard motor would be used in both fresh and salt water service. That's why stainless steel was the logical choice for many of the parts subject to hard usage and corrosive attack. However, the big question was, *which* types of stainless would assure the best possible service for each of the parts involved.

**THE ANSWER**—Collaborating with Chicago Steel Service metallurgists, Gale engineers selected 3 different types of stainless steel for the parts illustrated here. One, to give them the strength for parts under constant strain; two, to secure physical properties that could be derived from a heat-treatable grade; and three, to provide the corrosion resistance needed for parts coming in contact with fresh or salt water. Constantly alert for improvements, Gale recently turned to stainless steel for the shift rod which was formerly made of another metal, thus obtaining the extra qualities of stainless for this part as well.

Photos, courtesy Gale Products, Division of Outboard Marine & Mfg. Company, Galesburg, Illinois

It's one thing to recognize the need for stainless steel to meet performance requirements. But, it's equally important to know exactly which stainless can do the best job for you—in production and in service.

That's where the House of Stainless can serve you. We'll help you select the proper grade and type and then back up your selection with our comprehensive warehouse stocks or direct mill shipments through our mill placement department.

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# Motorola's Schiff Develops Managers

CREATE the proper atmosphere for development—or the rest of your executive training program will fall short.

That advice comes from Hans Schiff, assistant to the vice president of manufacturing, Motorola Inc. "The most stifling factors in administration," he believes, "are for supervisors to overspecify assignments and to demand errorless operations."

**Atmosphere**—The real test of an administrator, he points out, is whether he gets the best effort possible from the people he supervises. Teaching your potential managers is not enough—they must have an atmosphere in which they can not only put forth their best effort but can apply the principle in working with others.

"At Motorola," Mr. Schiff relates, "management tries to define the objective in sufficient detail—and perhaps inject a few road marks and caution points. But the method of reaching the objective within that framework is left to the individual. He works the problem out."

**Freedom To Err**—Consistent errors are never condoned, of course. But good management cannot demand errorless operations and expect to progress. When people are afraid of making errors, their activity tends to become stereotyped—initiative and innovation are discouraged.

Hans Schiff joined Motorola in 1950 and now heads the production activities of three divisions—military; stamping and plating; and car radio tuner manufacturing. Only 35, he set his goal to become an administrator while still at the University of Rochester—his education included both mechanical engineering and business administration.

**Chances**—Many engineering people overlook the great opportunities in management and administration, he says. The decision whether to specialize or get into administration should be made early by the individual.

Education today is not necessarily as unbalanced as many charge. Rather, the technical student should recognize the need for supplementing his education with the basic social, business and administration factors so vital in today's business activities.

**Full Job**—"If management is your goal," he suggests, "then work at it all the time. Learn to live with people, to bring out their best effort. Watch your opportunities; search them out if necessary, because good management men are always in demand."

Like most modern managers, Hans feels administrators have obligations in community activity, too. He recently purchased a new home in a small Chicago suburb and is currently running for election to a local government post. In his spare time, he puts his gardening and landscaping hobbies to good use.

## Nickel Production Up, Demand Skyrockets

(Free World production in tons)

| | Canada | U.S. | Cuba | New Caledonia | Others | Totals |
|---|---|---|---|---|---|---|
| 1955* | 174,500 | 3,250 | 15,000 | 17,500 | 4,750 | 215,000 |
| 1954 | 161,279 | 2,645 | 14,545 | 15,100 | 2,556 | 196,125 |
| 1953 | 143,693 | 602 | 13,844 | 18,800 | 2,512 | 179,451 |
| 1952 | 140,559 | 633 | 8,924 | 11,750 | 2,194 | 164,060 |
| 1951 | 137,903 | 756 | ..... | 7,400 | 2,048 | 148,107 |
| 1950 | 123,659 | 913 | ..... | 4,685 | 929 | 130,186 |

Source: U. S. Bureau of Mines
*Estimated by STEEL

# More Nickel on the Way

LOOK FOR relief from the nickel shortage—after 1958. A continuing scarcity through 1958 is likely as long as defense requirements remain at current levels.

Commerce Secretary Sinclair Weeks states: "The amount of market-price nickel available each month is becoming progressively less due to the continually increasing defense requirements." About 40 per cent available to the U. S. now goes for defense or the stockpile.

**Indications** — Maj. Gen. David Baker, director of procurement and production, Air Materiel Command, reports: "The rapid transition to 18-8 stainless steel in fighter and bomber airframe construction could result in requirements of approximately 35,000 tons per year, based on current levels of aircraft production through 1960. This amounts to 5 per cent of the total U. S. consumption of stainless."

Some 30 per cent of all nickel goes into stainless already. In 1955 some 17 per cent went into engineering alloy steels; 16 per cent into high-nickel alloys; 15 per cent into electroplating; 6 per cent to copper-base alloys; 5 per cent to jet engine alloys; 5 per cent to cast irons; and 6 per cent to industrial chemicals and miscellaneous uses.

**Sufferers**—Electroplaters and civilian users of stainless are probably hardest hit by the shortage. Electroplaters claim they are getting from 5 to 45 per cent of their needs. Stainless steelmakers could use 50 per cent more nickel when it's available.

Says S. C. Taormina, technical adviser, National Association of Metal Finishers: "If we could have just 5500 tons of nickel this year, job platers would be assured of keeping customers satisfied . . . and themselves in business."

Some fabricators say the shortage hurts seriously. And ferroalloy producers are unhappy about their take. They point to persistent rumors that part of the Nicaro production (1250 tons a month) is still going into stockpile. They could use the nickel oxide coming from Cuba.

**What To Do?** — Most observers believe that two things will bring relief—but not until after 1958.

First, a reform in U. S. stockpile policies would help. Second, increased production would aid.

**Stockpiling**—The long awaited Townsend report on nickel will be released this week. It will recommend the U. S. back new sources of supply rather than continue a heavy stockpiling schedule, says ODM Director Arthur S. Flemming. U. S. stockpile needs are hidden under a security label.

Because of security, nobody is saying when stockpile goals will be completed, but best guesstimates are for some time in 1958. Even the numerous deferments from stockpile aren't helping civilian users much. Most of the 15,500 tons deferred during the first half of 1956 are being snapped up by military-rated orders. The same thing will probably happen to the 20,000 tons to be diverted in the second half.

**Capacity Expansion**—Production capacity is increasing. The 222,500 tons expected to flow into the Free World's military and civilian coffers this year will be 7500 tons more than was produced last year (see table). The U. S. receives about two-thirds of the total. Canada, the United Kingdom and other parts of the Free World divide the remaining third.

Expansion projects look promising.

**Nicaro** — The U. S. project in Cuba, currently producing at an annual rate of some 15,500 tons, will reach a capacity of about 25,000 tons when expansions are completed this fall. The end product, originally produced as finely powdered nickel oxide, is being converted into sintered oxide of substantially higher nickel content. This conversion eliminates the losses incurred by steel mills and others in the use of the powdered material. It provides a better product for stockpile, too. By fall, part of the sintered oxides will be converted into metallic nickel. National Lead Co., operating Nicaro for the U. S., has leased a plant in Philadelphia to do this.

The General Services Administration is committed to dispose of Nicaro as soon as possible. It is not considered probable that any acceptable offer can be developed until there are sufficient production data available on the operation of the expanded facilities.

National Lead, Freeport Sulphur Co. and Bethlehem Steel Co. are in the pilot stage with several processes which could bring about a new method of beneficiating Cuban

nickel-bearing ores. Question: Will these new methods make the Nicaro facilities obsolete in the next six months, year or two years?

**Canada**—Developing new Canadian sources is a never ending project. International Nickel Co. of Canada Ltd., which produced 140,000 tons of nickel in 1955, explains that the company completed 522,000 ft of drillings during the year. By the end of last year, the exploration shaft on Inco's property at Moak Lake, Manitoba, had been completed to 1325 ft, and stations were cut at the 700 ft and 1300 ft levels. This indicates that there may be a substantial nickel deposit in this area.

**Oregon**—Ferronickel could help alleviate the shortage, too. M. A. Hanna Co. reports that during 1955, some 3250 tons (contained nickel) of ferronickel were produced at Riddle, Oreg. This combination of 45-per-cent nickel, 55-per-cent iron will be produced at an annual rate of 8000 tons this year. Hanna has its four furnaces in operation. Most of last year only two were in use. If all goes well, this could bring the price of ferronickel down before 1956 ends.

**1956-1958**—Look for: 1. Sheritt Gordon Mines Ltd. and Falconbridge Nickel Mines Ltd. — the other Canadian nickel producers— to assume greater importance in the market as they continue to expand. 2. Nicaro's sale to start a chain reaction (with proper U. S. guarantees) which would see several companies enter the field. 3. A more level-headed approach on stockpiling. 4. A continuing shortage through 1958 so long as defense requirements remain at current levels.

## Inco's Wingate Sees Steady Prices

"UNTIL CIVILIAN consumers can be given some feel on the direction which defense requirements will take in the future, it is not possible for them to plan their marketing and production programs intelligently," says Henry S. Wingate, president, International Nickel Co. of Canada Ltd.

**Problem**—"We cannot satisfy our customers' needs for nickel—yet we are faced with the perplexing problems of making long-range plans and sizing up future civilian demand at a time when some 40 per cent of the world's supply is going into military requirements and U. S. stockpile. This prevents any reasonable development and testing of civilian markets," he says.

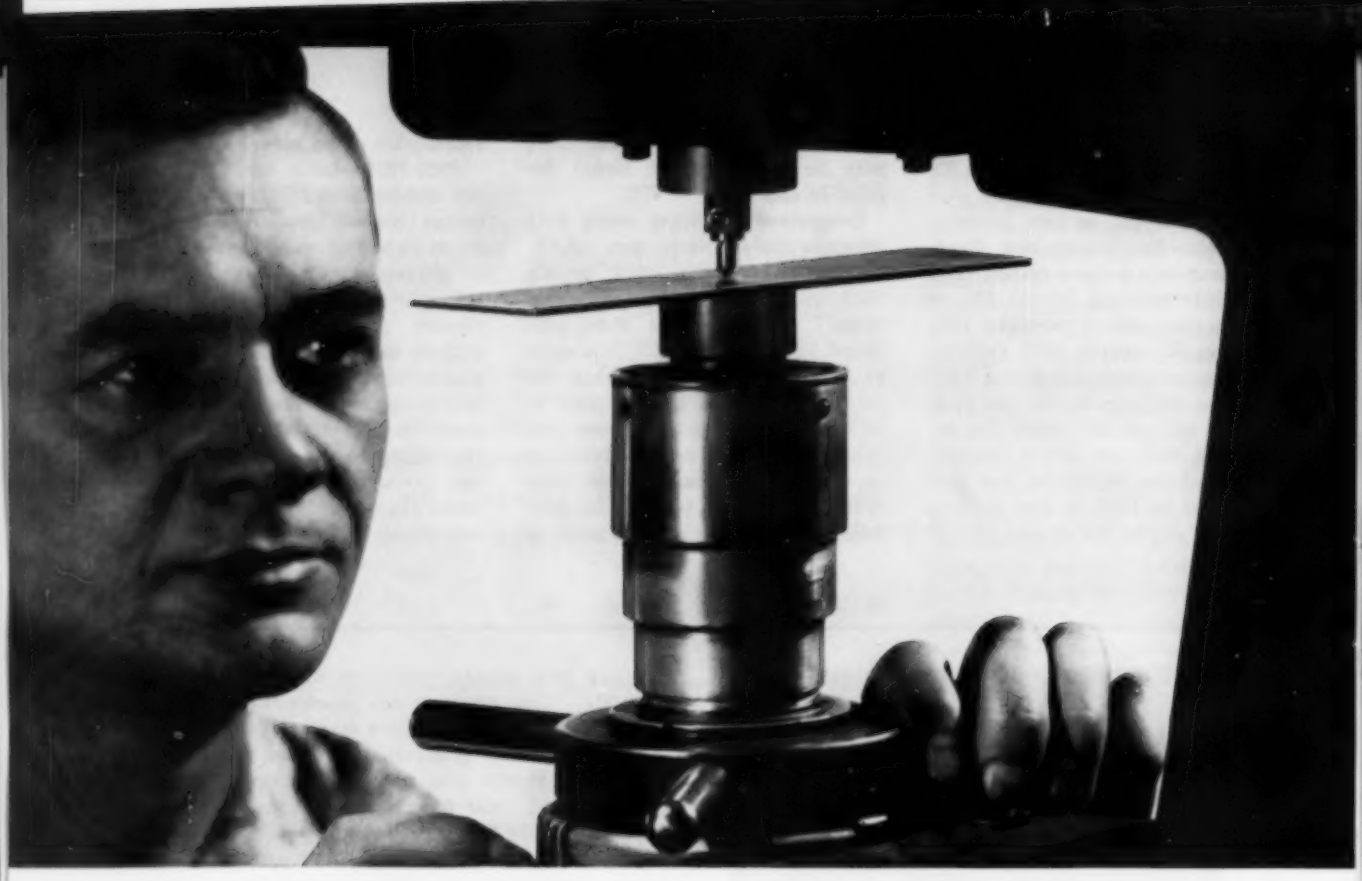
After straining production facilities to turn out some 140,000 tons of nickel during 1955, any increased yield from Inco this year must come principally from technological gains which may help produce a greater yield from the ores being beneficiated, Mr. Wingate explains.

**Prices**—"The shortage of nickel is already placing a heavy burden on consumers," he comments. "It is deterring their pursuit of long-range programs on new uses and is stimulating vigorous and harmful switchovers to substitute materials. To throw an additional burden on our customers at this time in the form of substantial price increases could well be the straw that broke the camel's back."

**Stockpile**—While it is hoped that stockpiling objectives may be reached in 1958 (or soon thereafter), Mr. Wingate points out the U. S. must be restudying the situation in the light of two factors—the growing belief that any major war would be of short duration and the fact that there has been a sharp increase in military demand over earlier estimates. The U. S. has intimated that, since military needs are up, the mobilization objectives might have to be raised, also. Mr. Wingate asks: If any major war is to be short, will a larger nickel stockpile be useful?

Inco's president agrees with others that standby facilities would be a better guarantee of adequate supplies than stockpiling. "But," he adds, "we cannot help but be affected by how the government might approach such a program. If it should undertake to guarantee markets for newcomers, will it also guarantee markets for the established producers who are spending millions annually in exploration for ore?"

Inco spends some $5 million a year on exploration. Says Mr. Wingate: "We are ready to exploit any nickel ore field which we feel is commercially sound."



# How Great Lakes Steel *puts the pressure* on quality

COILS ARE ANNEALED in these giant ovens to impart maximum softness and ductility. And then . . .

COILS ARE TEMPER ROLLED in a skin mill to give the stiffness, surface and flatness which have been specified by the customer for the order.

Right on the nose—not too hard, not too soft! This steel coil passes the Rockwell Test with tolerance to spare.

In the Rockwell, or hardness test, pressure is put on a sample piece of coil by a system of loads applied through a tiny ball. A needle gauge signals the depth of the impression. From this, our test engineers can readily tell: (1) if the coil was annealed to maximum softness for extra-deep drawing; and (2) if it is now properly tempered to meet customer specifications.

Quality control every step of the way—yes, that's our most important job at Great Lakes. Reason enough to call us and talk over your steel needs?

**GREAT LAKES STEEL CORPORATION**

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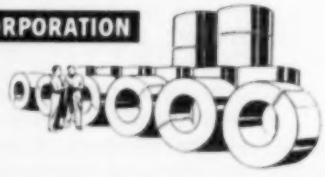

*District Sales Offices:* Boston, Chicago, Cincinnati, Cleveland, Grand Rapids, Houston, Indianapolis, Lansing, Los Angeles, New York City, Philadelphia, Pittsburgh, Rochester, St. Louis, San Francisco, Toledo, Toronto.

Ford Motor Co.

*This miniature rolling mill turns out steels for research as . . .*

# Ford's Scientists Catch Up

"OUR BIGGEST asset is top management's recognition of the need for long-range, fundamental research," says Dr. Andrew A. Kucher, director of Ford Motor Co.'s Scientific Laboratory in Dearborn, Mich.

Such reasoning was behind the lab's founding in 1951. Henry Ford II and Ernest Breech, dual heads of Ford's revitalized management team, realized the corporation should shoot for the lead in technological advances if it were to remain competitive with General Motors and Chrysler.

**Profited —** As a "Johnny come lately" in the automotive research field, Ford thinks it has avoided some of the hazards which besiege Chrysler and GM.

"We don't put out fires for other people," exclaims Dr. Kucher. Both manufacturing and engineering divisions of Ford have separate research staffs to carry out process and product development. These groups cover everything from studies in glass technology, casting methods and metal finishing to the development of automatic transmissions and power window lifts. That leaves the Scientific Laboratory free for fundamental research problems.

**Finances**—Although the lab is an administrative adjunct of the engineering staff, its money comes entirely from the general funds of the corporation, not the product divisions.

Dr. Kucher and his associates organize their own research programs. They answer only to top corporate management. Results: Freedom from divisional trouble shooting; little need to show a profit, or to charge other groups for research activities.

**Climate**—But the biggest boon to research stems from the climate for creativity established at the laboratory. Colver R. Briggs, manager of the administrative department, explains: "We know that salary is only part of the scientist's compensation."

Mr. Briggs cites four factors which lead to a proper research environment: 1. Give the scientist the best equipment and facilities possible. 2. Relieve him from all administrative burdens. 3. Provide a competent and complete technical information service. 4. Be willing to publish the results of his work promptly in technical journals.

To further stimulate research people, Ford gives them the oppor-

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tunity to associate with colleagues outside the company through the activities of scientific societies, adds Mr. Briggs.

The laboratory also holds weekly staff meetings, so men can exchange ideas among themselves and tell other staff members what they are doing.

**Exposure**—Each year the laboratory invites professors from colleges and universities to spend the summer at Dearborn working out problems of mutual interest.

Ford also brings visiting speakers into the lab each month. The most recent lecturer was Dr. Felix Bloch, 1952 Nobel prize winner and physics professor at Stanford University. Dr. Bloch discussed: "High Resolution Studies of Nuclear Magnetism."

**Breakdown** — Chemistry, metallurgy, physics and electronics departments do research in the physical sciences. The basic engineering, mechanical engineering and gas turbine departments are engaged in the application of new principles to engineering problems.

The laboratory will have some 135,000 sq ft of floor space in the $150-million Ford Research & Engineering center when its new building is completed later this year.

**Roster**—Among their many projects, the 190 scientists who staff the laboratory are studying fluid dynamics, reactor technology and radiation effects. Theoretical physics and mathematics are some other research fields.

In the physics department, Dr. J. E. Goldman, manager, points out: "Our research follows two paths. 1. We want to gain a complete understanding of phenomena as background knowledge to further research. 2. We must also develop new techniques to study these phenomena."

**Cool**—As a result, the physics department has been investigating the physical properties of copper-nickel alloys under extremely low temperatures. "Atoms just about stand still. We find the alloys show quite different properties when the atoms are not influenced by temperature," says Dr. Goldman.

Another project has been the invention of a portable infrared spectrometer to measure hydrocarbons in automobile exhausts. Dr. Goldman explains the tests have potential value in solving the growing smog problem facing many cities.

**Chemistry**—Dr. Eugene F. Hill, manager of the lab's chemistry department, mentions a colorimetric method of measuring boron content in steels as a recent development. Dr. Hill points to a catalytic muffler which may help the smog situation.

Another objective of this department is the development of synthetic lubricants which will operate in temperatures as high as 1000°F. Lubricants with these properties will be needed for gas turbine operation. Dr. Hill says tests show some of these experimental lubricants perform satisfactorily up to 500°F.

**Metallurgy**—This department is divided into four sections: Physical, process, ceramic and reactor metallurgy. E. D. Marande, manager, explains: "We attempt to choose projects which, in the long run, will create new, better and less costly products."

Metallurgists are working on the kinetic properties of iron-aluminum alloys to increase their ductility. Potential uses for these alloys are in high temperature, oxidation-resistant applications like blast furnace linings.

Considerable emphasis is being placed upon the development of new and improved cermets and ceramic substances to meet temperatures ranging from 1600 to 3100°F.

**Choice**—Dr. Kucher says: "There is little difficulty in finding subjects to pursue. The problem is one of selecting the area of maximum return."

## U. S. Auto Output

Passenger Only

| | 1956 | 1955 |
|---|---|---|
| January | 612,079 | 659,508 |
| February | 555,689 | 674,951 |
| March | 575,530 | 792,436 |
| April | 547,766† | 752,245 |
| 4 Mo. Total | 2,291,064† | 2,879,140 |
| May | | 723,868 |
| June | | 648,412 |
| July | | 658,696 |
| August | | 613,705 |
| September | | 460,443 |
| October | | 517,788 |
| November | | 749,061 |
| December | | 682,256 |
| Total | | 7,933,369 |

| Week Ended | 1956 | 1955 |
|---|---|---|
| Apr. 14 | 136,038 | 175,133 |
| Apr. 21 | 129,930 | 180,647 |
| Apr. 28 | 127,277 | 184,279 |
| May 5 | 112,730 | 172,031 |
| May 12 | 108,381† | 177,287 |
| May 19 | 105,000* | 176,441 |

Source: *Ward's Automotive Reports*
†Preliminary *Estimated by STEEL

## Ford Sets Up Subsidiary

Ford Motor Co. has established a California subsidiary called Aeronutronic Systems Inc. The company will cover a broad research field of advanced scientific and technological operations ranging from guided missile systems to possible exploration of outer space.

The nucleus of the new company will be a group of scientists and engineers who formerly were organized under the name of Systems Research Corp., Los Angeles.

Gerald Lynch, now director of Ford's office of defense products and governmental relations, will be president of the organization. He states: "We expect to take a missile or other project and see it through from conception to manufacture, possibly even to its utilization and maintenance."

## Chevrolet Expands Plant

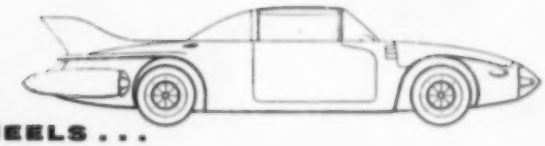
Chevrolet Motor Division of General Motors Corp. announces its Janesville, Wis., assembly plant will be increased by a 290,868-sq-ft addition.

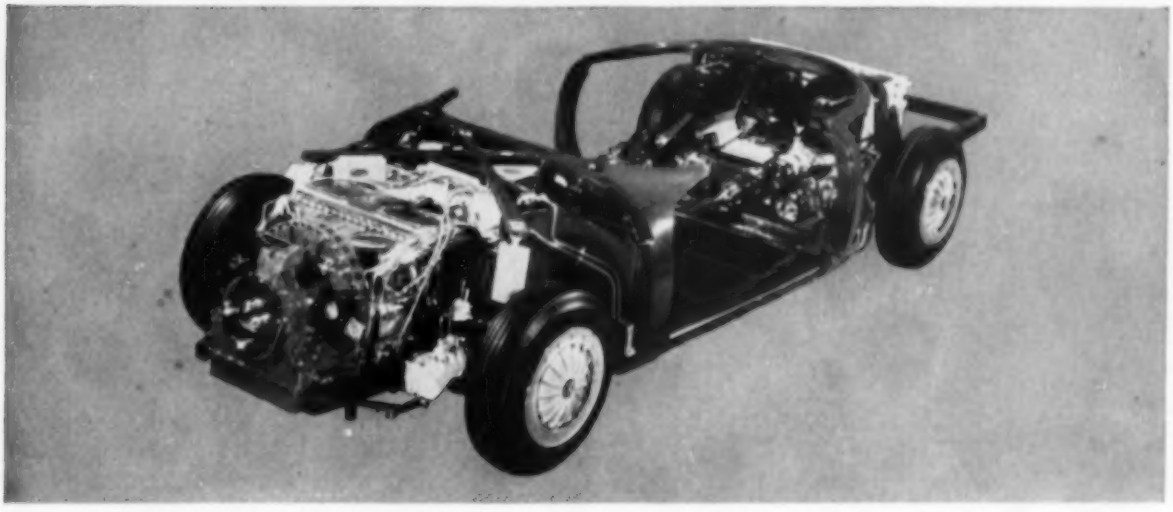
Added to recent Fisher Body expansion at the same plant, this brings over-all area to 1.7 million sq ft and boosts capacity 12.5 per cent, says Edward H. Kelley, general manufacturing manager.

One result: Chevrolet will start making its own station wagon bodies in the Fisher Body section of the plant rather than shipping them in from outside sources.

Mr. Kelley says daily production capacity will be boosted from 880 to 1000 cars. Including trucks, capacity will be 1400 vehicles daily.

**FROM 35000 RPM AT THE TURBINE**
**TO 2400 RPM AT THE WHEELS . . .**





# HYATTS SMOOTH THE FLOW OF POWER IN GM'S EXPERIMENTAL FIREBIRD II

Taming the terrific torque of this gas turbine developed by the GM Research staff is no job for ordinary bearings. Only the *finest* straight cylindrical roller bearings can stand the gaff!

HYATTS easily handle the whirlwind speeds generated, and at the same time let the turbine shafts float horizontally when they heat up. This "free lateral" feature automatically compensates for shaft expansion *without changing the bearing centers.* In the reduction gear train, too, HYATTS pass along the power with minimum frictional losses and maximum resistance to the punishing stress and strain.

So if you've got a tough gas turbine bearing problem, come to HYATT for help. Remember . . .

*HYATT has more experience with gas turbine applications of roller bearings than anyone else in the field—why not profit by it?*

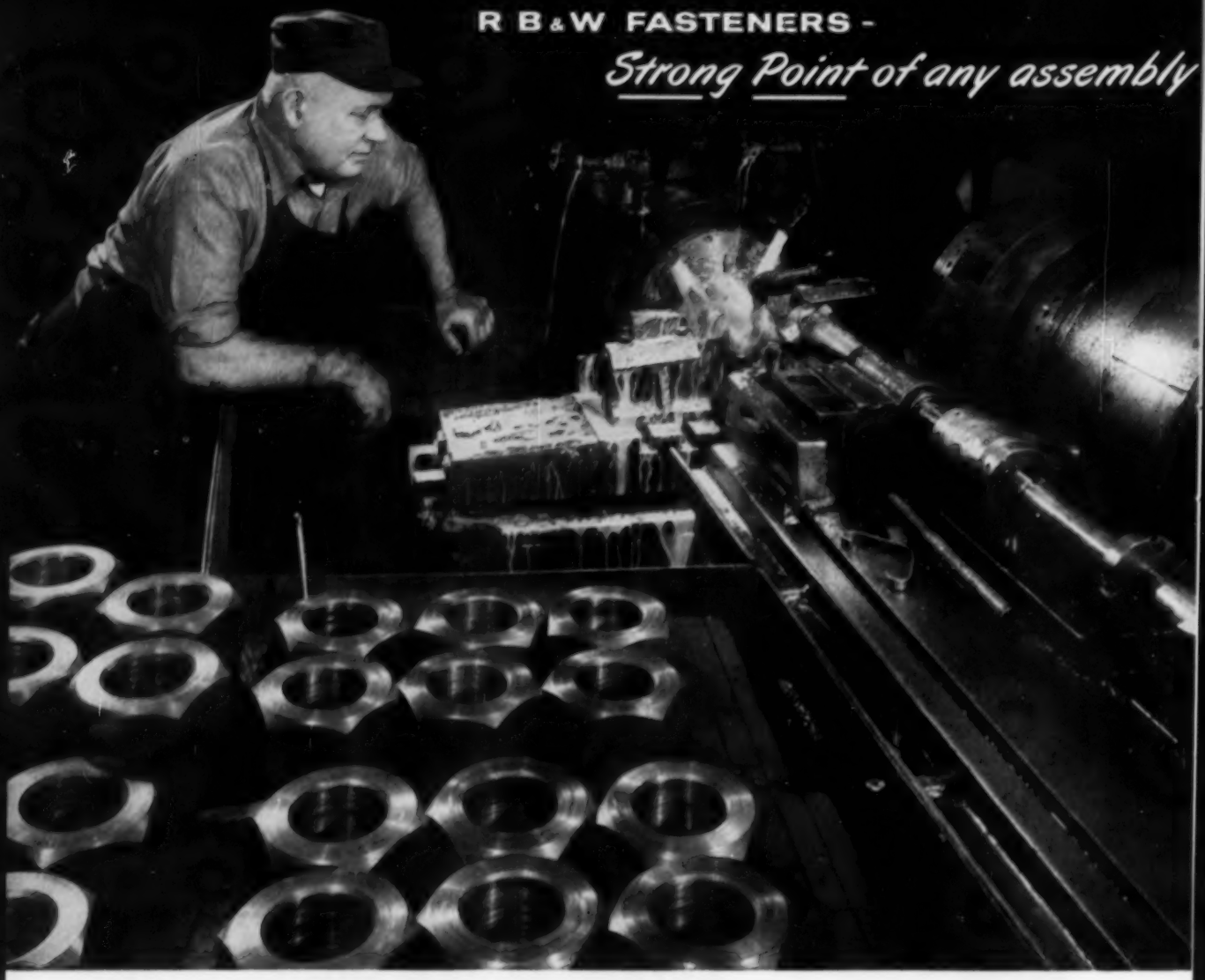
**HYATT ROLLER BEARINGS**

STRAIGHT ◯ BARREL ◯ TAPER ◯

HYATT BEARINGS DIVISION • GENERAL MOTORS CORPORATION • HARRISON, NEW JERSEY

R B&W FASTENERS -

*Strong Point of any assembly*



# Going to extremes to satisfy every need in fasteners

WHAT's the size-limit on nuts? Pretty high at RB&W, as you can see from the 4" giants above. At the other extreme, RB&W produces nuts down to ¼". Everything in between, too.

Most are made on automatic nut formers. Big stuff gets milled from hex bars, and needs more personal attention. Frank Culko, long on skill and precision, is shown keeping his expert eye on the operation. Like so many other RB&W craftsmen, he's been with the company for well over 20 years.

There's plenty of production skill and experience, plenty of facilities behind the avalanche of nuts flowing from RB&W. In fact, it was RB&W that developed the first cold-punched-nut machine, the first continuous automatic nut tapper, and pioneered the cold forming process. Also a fact: RB&W recently invested millions of dollars in bolt and nut making equipment to expand capacity.

RB&W goes all out on quality control, too... with a program recognized as the finest of its kind.

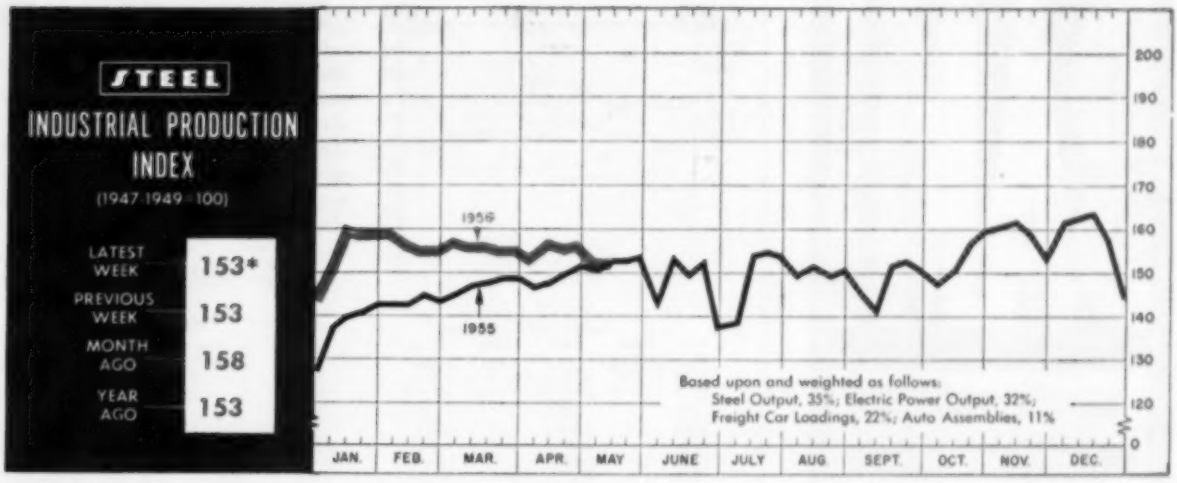
What does all this mean to *you*? More quality for your money. A truly reliable source of supply. Strong fasteners that never let you down.

Russell, Burdsall & Ward Bolt and Nut Co., Port Chester, N.Y.

R B & W

110th year

**Plants at:** Port Chester, N. Y., Coraopolis, Pa.; Rock Falls, Ill., Los Angeles, Calif. **Additional sales offices at:** Ardmore (Phila.), Pa.; Pittsburgh; Detroit; Chicago; Dallas; San Francisco. **Sales agents at:** Milwaukee; New Orleans; Denver; Seattle. **Distributors** from coast to coast.




*Week ended May 12

# Construction Boom Means Good Business

IT HAS been said this country never suffered a major depression while the construction industry was booming. On that basis, the economy is pretty sound this year, because that industry is setting new records almost every month. The pattern likely will continue, resulting in a new annual record for 1956 and plenty of business for metalworking industries which supply it.

The departments of Commerce and Labor report that April equaled the high for that month with construction outlays of $3.3 billion. That was 9 per cent over March and brought the first-four-month total to $11.8 billion, the same as the corresponding period last year. Several segments of the industry set April records, including commercial building and sewer and water facilities. Private industrial building achieved a record for any month.

**Better Future**—The most important decrease in the government's figures for the first four months was an 8-per-cent drop in private housing from last year's period. However, a look at the chart and table on page 88 indicates this segment is in for a big boost. F. W. Dodge Corp. reports that contract awards for *future* construction in the 37 eastern states set an April record and was the second highest month on record (May, 1951, with its big Atomic Energy Commission awards was tops). Awards for the first four months are running 13 per cent ahead of last year's period.

Especially important is April's residential figure of $1.144 billion, the best in Dodge's history. Inasmuch as there is a considerable time lag between contract award and construction (on which the government's figures are based) it is obvious that construction put in place is headed for an upswing.

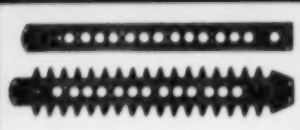
**Too Much Boom?**—"It is just possible that construction demands and contract commitments may rise too fast for the industry's available manpower and material

## BAROMETERS OF BUSINESS

| | LATEST PERIOD* | PRIOR WEEK | YEAR AGO |
|---|---|---|---|
| **INDUSTRY** | | | |
| Steel Ingot Production (1000 net tons)[2] | 2,355[1] | 2,343 | 2,338 |
| Electric Power Distributed (million kw-hr) | 10,800[1] | 10,815 | 9,673 |
| Bituminous Coal Output (1000 tons) | 10,015[1] | 10,160 | 8,552 |
| Petroleum Production (daily avg—1000 bbl) | 7,100[1] | 7,084 | 8,552 |
| Construction Volume (*ENR*—millions) | $557.7 | $389.0 | $458.7 |
| Auto, Truck Output, U. S., Canada (*Ward's*) | 144,102 | 148,677 | 221,746 |
| **TRADE** | | | |
| Freight Car Loadings (1000 cars) | 765[1] | 771 | 757 |
| Business Failures (Dun & Bradstreet) | 265[1] | 277 | 233 |
| Currency in Circulation (millions)[3] | $30,296 | $30,181 | $29,859 |
| Dept. Store Sales (changes from year ago)[4] | −7% | −2% | +9% |
| **FINANCE** | | | |
| Bank Clearings (Dun & Bradstreet, millions) | $20,671 | $23,246 | $18,803 |
| Federal Gross Debt (billions) | $275.7 | $275.7 | $276.6 |
| Bond Volume, NYSE (millions) | $22.3 | $21.0 | $17.8 |
| Stocks Sales, NYSE (thousands of shares) | 12,855 | 13,184 | 11,042 |
| Loans and Investments (billions)[4] | $85.4 | $85.3 | $84.5 |
| U. S. Govt. Obligations Held (billions)[4] | $27.4 | $27.5 | $33.6 |
| **PRICES** | | | |
| STEEL's Finished Steel Price Index[5] | 210.45 | 210.45 | 194.53 |
| STEEL's Nonferrous Metal Price Index[6] | 277.0 | 277.1 | 237.0 |
| All Commodities[7] | 113.7 | 113.8 | 110.4 |
| Commodities Other Than Farm & Foods[7] | 121.4 | 121.4 | 115.7 |

*Dates on request. [1]Preliminary. [2]Weekly capacities, net tons: 1956, 2,461,893; 1955, 2,413,278. [3]Federal Reserve Board. [4]Member banks, Federal Reserve System. [5]1935-1939=100. [6]1936-1939=100. [7]Bureau of Labor Statistics Index, 1947-1949=100

BAM!



Machined parts cost $3.00
Presteel stampings cost 78¢

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**The Result?** Low cost, just 78¢ per pair for these two complex parts, a **74% reduction** in price! Accuracy, equal to that achieved by machining! Quality, identical to the machined parts! Speed, far greater than before! Bring us your "impossible" pressing problem where cost is a big factor. The tougher the job, the better we'll like it! Mail the coupon today.

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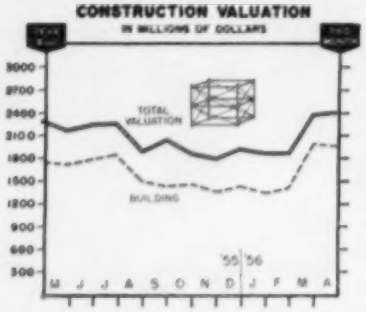
## THE BUSINESS TREND

**CONSTRUCTION VALUATION**
IN MILLIONS OF DOLLARS

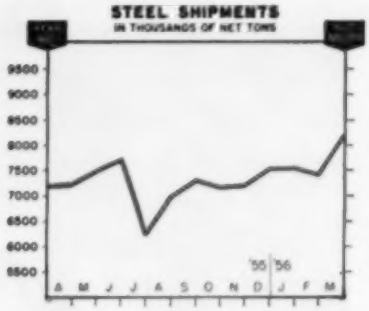



37 States

| | Total | | Building | |
|---|---|---|---|---|
| | 1956 | 1955 | 1956 | 1955 |
| Jan. | 1,858.2 | 1,504.5 | 1,355.7 | 1,255.1 |
| Feb. | 1,859.7 | 1,581.1 | 1,429.3 | 1,278.6 |
| Mar. | 2,382.0 | 2,134.8 | 1,986.5 | 1,748.6 |
| Apr. | 2,421.5 | 2,322.1 | 1,965.6 | 1,776.1 |
| May | ..... | 2,185.1 | ..... | 1,737.1 |
| June | ..... | 2,255.2 | ..... | 1,793.7 |
| July | ..... | 2,271.5 | ..... | 1,851.6 |
| Aug. | ..... | 1,894.6 | ..... | 1,516.9 |
| Sept. | ..... | 2,034.9 | ..... | 1,442.2 |
| Oct. | ..... | 1,862.7 | ..... | 1,474.8 |
| Nov. | ..... | 1,796.8 | ..... | 1,388.3 |
| Dec. | ..... | 1,920.8 | ..... | 1,438.0 |
| Total | ..... | 23,764.3 | ..... | 18,701.0 |

F. W. Dodge Corp.
Charts copyrighted, 1956, STEEL

**STEEL SHIPMENTS**
IN THOUSANDS OF NET TONS




Net Tons

| | 1956 | 1955 | 1954 |
|---|---|---|---|
| Jan. | 7,587,870 | 6,869,958 | 5,727,690 |
| Feb. | 7,468,393 | 6,119,900 | 5,364,978 |
| Mar. | 8,255,824 | 7,268,795 | 5,583,690 |
| Apr. | ..... | 7,279,321 | 5,287,972 |
| May | ..... | 7,540,889 | 5,423,168 |
| June | ..... | 7,770,213 | 5,887,488 |
| July | ..... | 6,250,597 | 4,490,179 |
| Aug. | ..... | 7,053,615 | 4,681,242 |
| Sept. | ..... | 7,378,247 | 5,004,222 |
| Oct. | ..... | 7,216,821 | 5,035,364 |
| Nov. | ..... | 7,247,994 | 5,240,209 |
| Dec. | ..... | 7,580,943 | 5,448,649 |

American Iron & Steel Institute

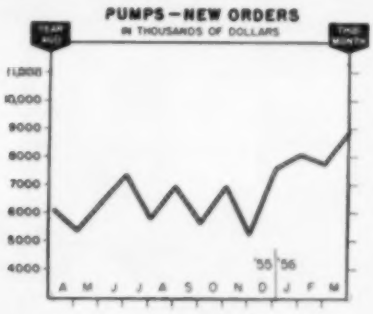
supply," says Thomas S. Holden, vice chairman of F. W. Dodge. The year-to-year gain is slipping a little bit (it was 17 per cent in March, compared with 13 per cent in April), but Mr. Holden is confident of a new annual record for construction. The same growth factors that have been so strong since the end of World War II are still with us, and big backlogs in several segments of the industry will keep things humming. If construction continues to account for about 10 to 11 per cent of the gross national product, Mr. Holden conservatively estimates that new investment in the industry by 1965 will range between $52.5 billion and $58 billion. (This compares with $42.5 billion last year and a conservative estimate of $44 billion this year.)

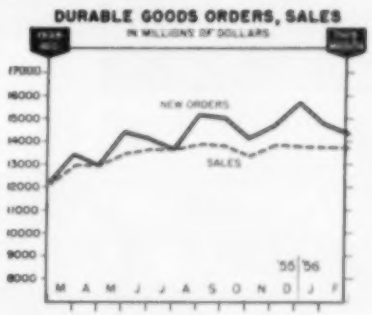
## Production Index Slips

This tremendous construction activity has no direct influence on STEEL's industrial production index, which fell to a preliminary 153 (1947-1949 = 100) for the week ended May 12. This followed a revised figure of 153 for the week ended May 5. This is the lowest reading on the trend line since the first week of January. The big reason, of course, is the decline in the steel operating rate caused by a railroad strike at U. S. Steel Corp.'s Tennessee Coal & Iron Division in Birmingham. That caused weekly steel output to drop below the 2.4-million-ton mark for the first time since the last week in December, according to the American Iron & Steel Institute.

At the same time, automotive assemblies slid to the lowest mark since the Christmas-New Year holidays. *Ward's Automotive Reports* says only 133,821 car and truck assemblies rolled off the lines during the week ended May 12, and the figure may go lower. It seems the spring sales upsurge never quite materialized, so producers are cutting schedules even more to reduce dealers' stocks. Estimates put new cars in dealers' hands at anywhere up to 900,000.

Electric energy distribution is holding at about 10.8 billion kw-hr per week, high for this season of the year, says Edison Electric Institute. Daylight saving time has cut down home consumption for a while, and generally mild weather conditions have held off heavy use of air conditioners. Even so, weekly figures are still about 13 per




| | 1955 | 1954 | 1953 |
|---|---|---|---|
| Jan. | 8,094 | 5,220 | 4,057 |
| Feb. | 7,735 | 6,709 | 4,272 |
| Mar. | 8,987 | 6,161 | 5,093 |
| Apr. | | 5,447 | 5,319 |
| May | | 6,411 | 5,007 |
| June | | 7,419 | 5,176 |
| July | | 5,834 | 4,733 |
| Aug. | | 7,022 | 6,706 |
| Sept. | | 5,664 | 5,050 |
| Oct. | | 7,048 | 3,828 |
| Nov. | | 5,249 | 5,224 |
| Dec. | | 7,624 | 4,787 |
| Total | | 75,808 | 59,252 |

Hydraulic Institute

| | New Orders* | | Sales* | |
|---|---|---|---|---|
| | 1956 | 1955 | 1956 | 1955 |
| Jan. | 14,683 | 12,142 | 13,595 | 11,850 |
| Feb. | 14,311† | 12,170 | 13,612 | 12,029 |
| Mar. | | 13,353 | | 12,860 |
| Apr. | | 12,879 | | 12,805 |
| May | | 14,331 | | 13,322 |
| June | | 14,033 | | 13,527 |
| July | | 13,571 | | 13,503 |
| Aug. | | 15,145 | | 13,745 |
| Sept. | | 14,936 | | 13,692 |
| Oct. | | 14,094 | | 13,261 |
| Nov. | | 14,680 | | 13,721 |
| Dec. | | 15,605 | | 13,688 |

*Seasonally adjusted. †Preliminary
U. S. Office of Business Economics

cent ahead of corresponding 1955 totals.

Revenue freight car loadings remain the brightest spot among the index components. The Association of American Railroads reports that loadings totaled 770,558 for the week ended May 5, or 4.6 per cent ahead of the corresponding week last year. With iron ore shipments moving more normally, the figure could go up in the next week or so.

## Pumps Ride Boom

New orders for hydraulic pumps reflect the high level of industrial activity. The Hydraulic Institute reports March orders worth $8,986,770, a new record for the industry (see chart above). With capital expenditures headed for a new high this year, the pump industry will probably set some more records of its own.

## Steel Shipments Ride High

Steel shipments set a new monthly record in March, says AISI (see chart, page 88). The total of 8,255,824 net tons broke the record set last June. It may be June again before the present record is eclipsed. April output, according to AISI, was 10,547,000 net tons for ingots and castings. Assuming a scrap loss of about 25 per cent, this would mean shipment of about 7,910,000 tons. May, another 31-day month, could do better were it not for small strikes and repairs to the overworked furnaces. But present indications point to shipments totaling about 7,752,000 tons this month. For a breakdown of March shipments by products, see the table on page 183.

## Handling Equipment Up

Another record was set in the material handling industry. Bookings were lifted to a new high of 166.14 (1954 mean = 100). The Material Handling Institute points out that even though March bookings are normally high, this year they were much more than seasonal. The increase over February was 36.58 points. Bookings for the first three months of 1956 averaged 139.38, compared with the 1955 average of 121.46. The record so far indicates the industry was not off base when it predicted average bookings for 1956 will exceed 1955 average bookings by more than 10 per cent.

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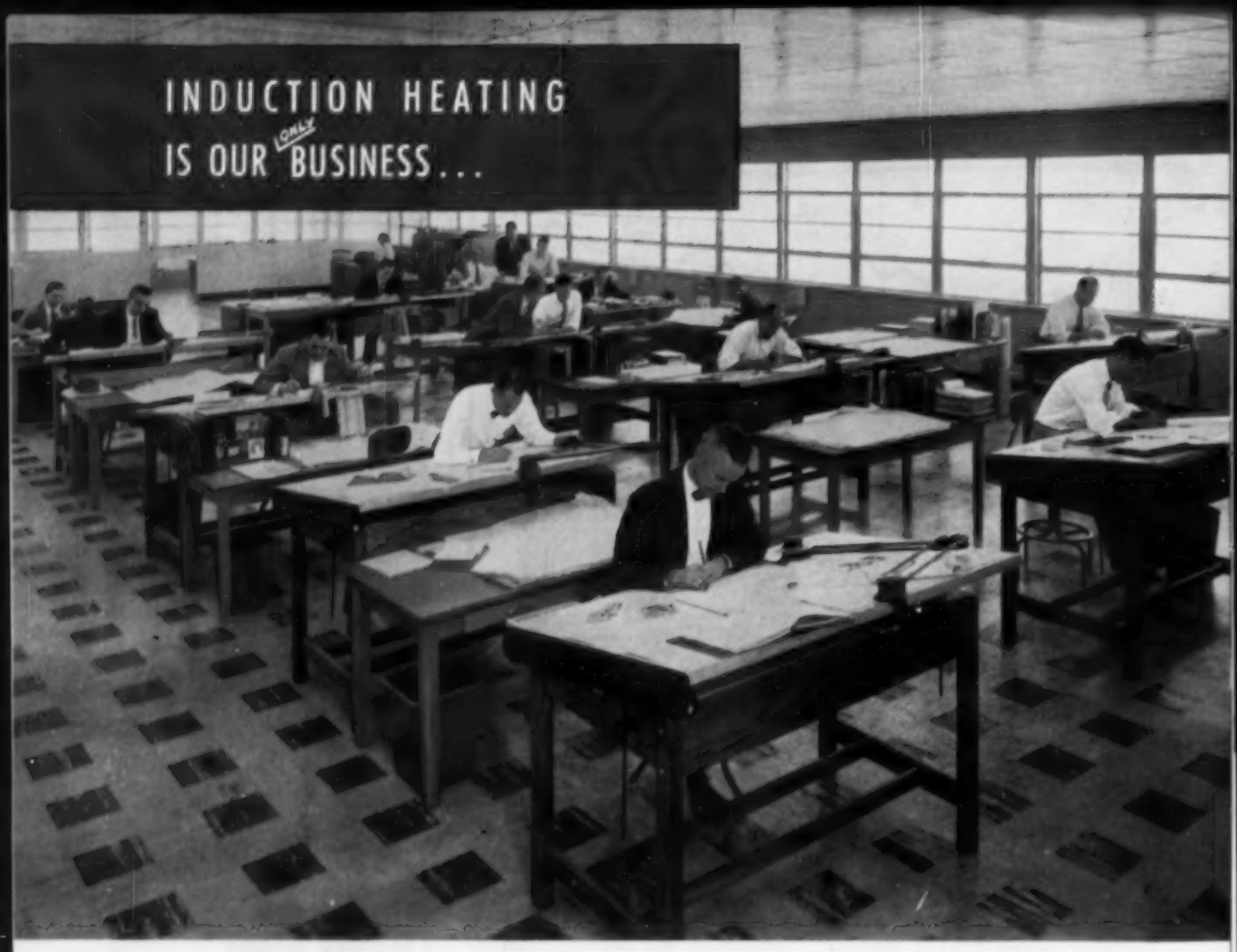


*Subject at hand . . .*

# INDUCTION HEATING EQUIPMENT

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AT THROUGH 10,000 CYCLES

CARL J. SIEBERT
*. . . sales mgr. of W-S Fittings Div.*

**Carl J. Siebert** was appointed sales manager, **W-S Fittings Division,** H. K. Porter Company Inc., at Roselle, N. J. He was Chicago district manager.

**Albert J. Fischer** was made works manager, **Adamas Carbide Corp.,** Kenilworth, N. J. He was director of research and development. **Michael J. Kniola** joins the firm as production manager. He was with Carboloy Department, General Electric Co.

**Fischer & Porter Co.,** Hatboro, Pa., elected **Philip E. Sellers** vice president-sales; **Herman Kockritz,** field sales manager; and **William Trethaway,** Atlanta district manager.

**Marcus P. Orr** was named assistant manager, roll sales, **Mackintosh-Hemphill Division,** E. W. Bliss Co., Pittsburgh.

**Wayne Goldie** was made director of engineering and sales, **Pastushin Industries Inc.,** Los Angeles.

**McCulloch Motors Corp.,** Los Angeles, appointed **Charles L. Hammond** purchasing agent and **Michael H. Kuzyk,** assistant purchasing agent.

**G. C. Kubitz** was elected vice president-sales and **Fred Terens,** vice president-production at **Aluminum Goods Mfg. Co.,** Manitowoc, Wis.

ARTHUR LEHR
*. . . Bliss & Laughlin president*

**Arthur Lehr** was elected president, **Bliss & Laughlin Inc.,** Harvey, Ill. He succeeds **Carl L. Huff,** who was elected chairman and chief executive officer. **Charles O. Kalman,** former chairman, was elected honorary chairman. **J. Stanley McCord** was elected vice president-eastern operations at Buffalo.

**Henry C. Miller** was appointed machine tool sales manager, **Axelson Division,** U. S. Industries Inc., Los Angeles. He joined Axelson early in 1956. He was previously with Elmes & King Division, American Steel Foundries.

**Allegheny Ludlum Steel Corp.,** Pittsburgh, appointed **John B. Henry Jr.** product manager of high temperature metals and valve steels; **George C. Kiefer,** manager of application development.

**Fyr-Fyter Co.,** Dayton, O., elected **Frank R. Bridges** to the new post of vice president-manufacturing, Safa Alarm Division. He was with Gamewell Co.

**William C. Meyer** was named purchasing agent, East Pittsburgh, Pa., divisions, **Westinghouse Electric Corp.** He succeeds **C. W. Ellingson Jr.,** now director of purchases for the apparatus group.

**Morris W. Jones** was made general sales manager, **Sargeant & Wilbur Inc.,** Pawtucket, R. I.

JOHN G. SEILER
*. . . president of Tube Turns*

**John G. Seiler** was elected president, **Tube Turns,** Louisville, a division of National Cylinder Gas Co. He succeeds **George O. Boomer,** retired. Mr. Boomer will continue as chairman of the executive committee of National Cylinder Gas Co. Mr. Seiler also was elected vice president of National Cylinder Gas.

**Edgcomb Steel Co.,** Philadelphia, promoted **R. A. Shattuck** to manager, Philadelphia sales; and **P. B. Kline** to manager, stainless steel. Mr. Shattuck was product manager-tool steel. Mr. Kline was product manager-stainless steel sales.

**Paul G. Tomalin** was made general manager, **MacGregor-Comarain Division,** National-U. S. Radiator Corp., at Philadelphia.

**Leonard A. Rafferty** was made manager of the Pittsburgh office of **Motch & Merryweather Machinery Co.** Formerly assistant manager, he succeeds **J. T. McCuen,** who will serve as a sales consultant in the Pittsburgh office.

**Paul C. Hutchinson** was made director of sales, instrument division, **Perkin-Elmer Corp.,** Norwalk, Conn. He was sales manager for the firm's laboratory analytical instruments.

**John H. McKenna** was elected vice president, **Roberts Numbering Machine Co.,** Brooklyn, N. Y. He was

**MARVIN R. ANDERSON**
*. . . president of Michigan Tool*

**DAVID H. MacADAM JR.**
*. . . Hawthorne Metal Products sales mgr.*

**EARL COTE**
*. . . Webb Forging v. p.-gen. mgr.*

executive assistant to the president of Clifton Conduit Co.

**Marvin R. Anderson** was elected president, **Michigan Tool Co.**, Detroit. Formerly executive vice president, he succeeds **Oscar L. Bard**, now chairman.

**Wyn McCoy** was promoted to sales promotion manager, industrial division, **Timken Roller Bearing Co.**, at Canton, O. He was district manager of the division at Chicago.

**Lin Reed** was made manager, research and development department, **Union Steel Products Co.**, Albion, Mich.

**Dr. Irving Roberts**, associated with **Reynolds Metals Co.** as a consulting engineer for the last five years, was appointed director of planning. He has headquarters in Richmond, Va.

**Acme Steel Co.**, Chicago, appointed **Paul W. Coffman** superintendent, cold mill division; and **William H. Fulwider** superintendent, electrical division.

**C. E. Miller** was made assistant superintendent of the industrial engineering department, Pueblo, Colo., plant, **Colorado Fuel & Iron Corp.**

**Robert A. Lareau** was elected president of **Air-Way Industries Inc.**, Toledo, O. He has been president of White Products Corp., a subsidiary.

**David H. MacAdam Jr.** was made sales manager, **Hawthorne Metal Products Co.**, Royal Oak, Mich. He was sales engineer for Standard Products Co.

**James B. Black Jr.**, sales manager in Denver for **Columbia-Geneva Steel Division**, U. S. Steel Corp., fills the new post of assistant vice president-sales with headquarters in San Francisco. **Ralph T. Mitchell** succeeds Mr. Black in Denver.

**V. A. Kirby** was made vice president and manager, western plants for **John Wood Co. Ltd.**, subsidiary of International Metal Industries Ltd. He continues headquarters in Winnipeg, Canada, where he was plant manager. **T. H. Gibson** was made vice president and manager of the Winnipeg plant.

**E. P. Larsh** was elected president, **Master Electric Co.**, Dayton, O., to succeed **L. L. Warriner**, retired. Mr. Larsh continues as chairman.

**James MacBeth**, in charge of pig iron and ferroalloy sales for U. S. Steel Corp., joined **Pittsburgh Coke & Chemical Co.**, Pittsburgh. He will serve in an advisory capacity in connection with sales to the steel industry.

**Willard Danner** was named manager of eastern sales for **Armco Steel Corp.** He will have headquarters in Middletown, O. **Sidney Yager** succeeds Mr. Danner as Chicago district sales manager.

**Earl Cote**, general manager, **Webb Forging Co.**, Belleville, Mich., was elected vice president-general manager.

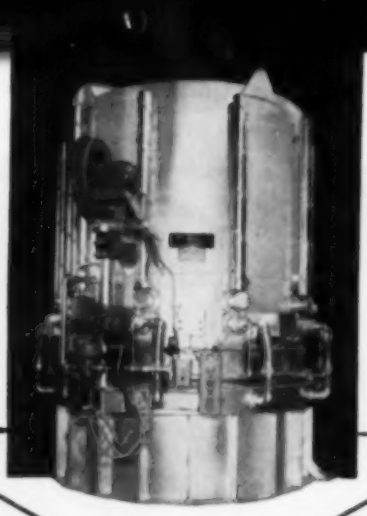
**Climax Molybdenum Co.**, New York, appointed **Robert R. Freeman** manager, arc-cast molybdenum development. He was with Westinghouse Electric Corp. in various engineering and supervisory capacities.

**Haran W. Bullard** was promoted from superintendent of mills, **Fairfield Steel Works** of Tennessee Coal & Iron Division, U. S. Steel Corp., at Birmingham, to assistant to the manager, manufacturing operations. He is succeeded by **George D. Brengleman**, former assistant general superintendent of the **Ensley Steel Works. John J. Shannon** takes over Mr. Brengleman's post and **Robert Bruce** replaces Mr. Shannon as superintendent of blast furnaces, Ensley Works.

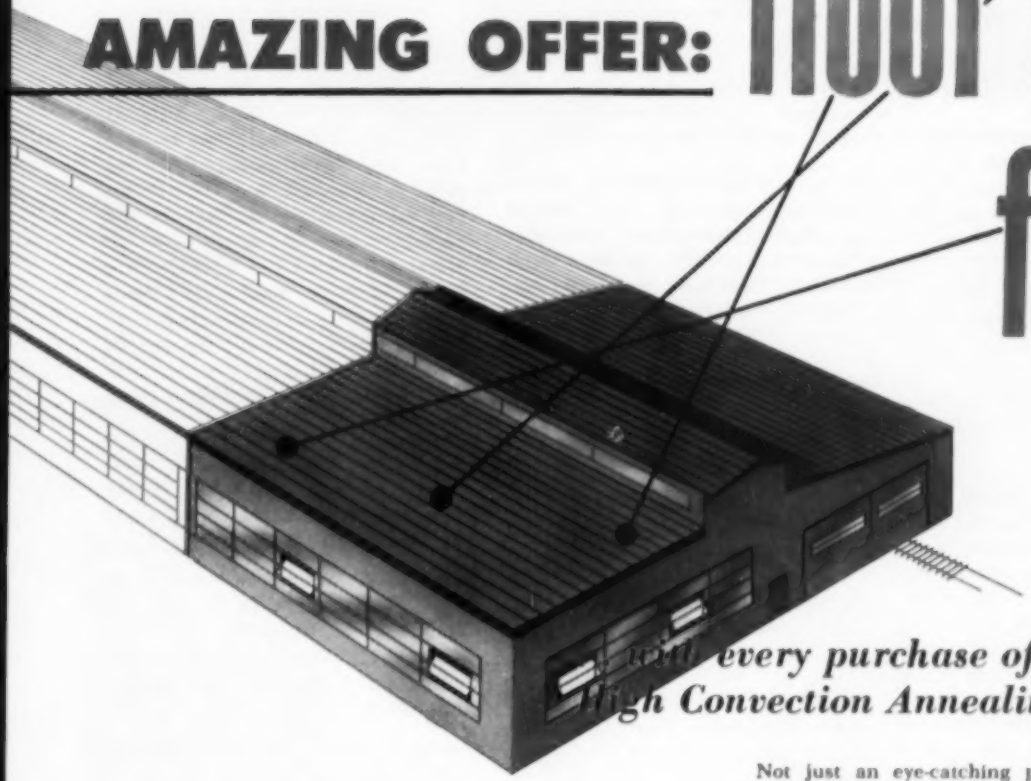
**Stack Steel & Supply Co.**, Seattle, appointed **Wayne F. McRae** director of purchasing and **Charles J. Gorsich** as assistant sales manager.

**Sharon Steel Corp.**, Sharon, Pa., appointed **Robert W. Keenan** assistant manager of its order and production planning department.

**Permacel Tape Corp.** appointed **Lew Harwood** southern automotive division manager at Atlanta; and **Frank DeHaven**, midwest automo-



# AMAZING OFFER: Industrial floor area free!



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*. . . Welding Fittings v. p.-sales*

RUSSELL DUPUIS
*. . . Vickers' Omaha plant manager*

H. D. McLEESE
*. . . Metal & Thermit vice president*

tive division manager at Chicago.

**S. C. Carrier** was elected vice president-sales, **Welding Fittings Corp.**, with headquarters in the New York sales office. He was general sales manager.

**Sterling Grinding Wheel Co.** appointed **William F. Schlick** sales manager, western region, with headquarters in Chicago. **James L. Goodwin** was made sales manager, eastern region, with headquarters in Cleveland.

**Allen C. Menke** was elected vice president, air conditioning and heating sales, **Trane Co.**, La Crosse, Wis. He was sales manager, air conditioning, and is succeeded by **R. H. Pearse Jr. William C. Dackis** was made manager, heat-exchanger sales; **A. James Hackl**, sales manager, packaged equipment; **Harry F. Griese Jr.**, manager, Climate Changer sales; and **C. L. Ringquist**, manager, applications engineering department.

**William R. Mason** was named production engineer at **Arcadia Metal Products**, Fullerton, Calif.

**Russell Dupuis** was made plant manager, Omaha Production Division, **Vickers Inc.**, Detroit.

**Peter V. Moulder**, formerly executive vice president, was elected president, **International Harvester Co.**, Chicago. He succeeds **John L. McCaffrey**, now chairman. Mr. McCaffrey continues as chief executive officer.

**Vernon H. Vogel** was made director of engineering, aeronautical division, **Robertshaw-Fulton Controls Co.**, Anaheim, Calif.

**Stephen J. Mueller** was elected vice president-sales, **Conveyor Systems Inc.**, Chicago.

**Robert M. Simpson** was made manager, Los Angeles sales branch, **Crucible Steel Co. of America.**

**Okonite Co.**, Passaic, N. J., elected **Rhea P. Lapsley** vice president in charge of research and product development.

**Harold J. Myers** was made supervisor of product sales, **Union Switch & Signal Division**, Westinghouse Air Brake Co., Pittsburgh.

**H. D. McLeese** was elected a vice president of **Metal & Thermit Corp.**, New York. He was general sales manager and continues as chief sales executive. He will direct sales, market development and research, and advertising of all Metal & Thermit and United Chromium Division products. **Owen Richards** was named manager of the corporation's new mine and titanium ore dressing plant now under development at Beaver Dam, Va.

**Thomas A. Sullivan** was made works manager of **A. O. Smith Corp.'s** frame manufacturing plant at Granite City, Ill.

**Wallis W. Wood** was made manager of Plant 15 in Greensburg, Ind., **Bohn Aluminum & Brass Corp.** He was assistant works manager, Cleveland Graphite Bronze Co.

**John G. Frischkorn** was made district sales manager by **Cleveland Tramrail Division**, Cleveland Crane & Engineering Co., Wickliffe, O. His territory includes parts of West Virginia, Pennsylvania, New York and eastern Canada.

---

## *OBITUARIES . . .*

**Nels E. Flodin**, 55, manager of the Latrobe, Pa., plant, **Alco Products Inc.**, died Apr. 29.

**Albert J. Grother**, 52, vice president-general manager, Iowa-Nebraska Division, **Armco Drainage & Metal Products Inc.**, died Apr. 27.

**Herbert B. Sabin**, 91, founder and president, **Sabin Machine Co.**, and president of **Steelblast Abrasives Co.**, both of Cleveland, died May 2.

**Andrew L. Pomeroy**, 42, associate director of research and development at **Thompson Products Inc.**, Cleveland, died May 10.

# COMMON SENSE says it's better...

# Twin Screw Knee Support

Available under Tool-Lease program

**Think it over... twin screw knee support is the one really new basic advancement in knee type milling machine design in years. And only Kearney & Trecker new TF Series machines have it!**

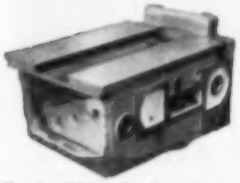
**Here's why it makes sense.**

Because the *twin screw* design distributes most effectively the weight of much larger, heavier knees, saddles and tables, it fulfills today's requirements for higher speeds, feeds and power — greater machine capacity. What's more, this *balanced design* substantially increases stability under heaviest loads... offers greater resistance to torsional thrust under all cuts... divides the wear factor in half, thus assuring greater, longer-lasting accuracy.

Kearney & Trecker's feature-packed TF Series line of general production machines is available in five sizes — No. 2 to No. 6, from 10hp to 50hp in Plain, Universal and Vertical styles.

Why take less than the latest when you want new milling machines? You can get all the facts on the new TF's from your Kearney & Trecker representative, or write direct to Kearney & Trecker Corp. Mail coupon for new catalog with details on TF Series machines.

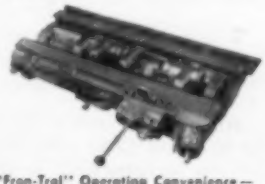
## 5 more reasons why TF Series milling machines are way out front in rigidity



**Heavier, Wider, One-Piece Knee — The TWIN SCREW arrangement supports the heavier, larger knee. Span and length of ways is increased considerably, providing fuller saddle support . . . lasting accuracy . . . substantial reduction of way and gib wear.**

**Three-Bearing Spindle — Complete assembly consists of three heavy-duty bearings, flywheel, a train of wide-faced forged steel gears. Rigidity of spindle unit contributes to increased cutter life, better finish and quieter operation.**

**Double "Vibra-Void" Overarms — Two solid steel bars, mounted completely through column, void vibration at source, afford more rigidity and resistance to deflection than any other type support. Design also greatly simplifies changing of arbors and cutters.**



**"Fron-Trol" Operating Convenience — Front-mounted controls include feed selection, Mono-Lever table feed and rapid traverse, automatic cycle table feed and rapid traverse controls, table handwheel, saddle clamping gib and backlash eliminator. Machines have 2" dia. table feed screw.**

**Massive Column — Solid back, double-box section column is scientifically ribbed throughout to rigidly withstand heaviest cutting forces. Full bearing column face affords maximum support for the knee. Cross-mounted motor assures maximum ventilation, easy access for routine maintenance.**

KEARNEY & TRECKER MILWAUKEE

BUILDERS OF PRECISION AND PRODUCTION MACHINE TOOLS SINCE 1898

**KEARNEY & TRECKER CORPORATION**
6790 W. National Avenue, Milwaukee 14, Wisconsin
Please send me Catalog No. TF-50 with details on new line of TF Series Plain, Universal and Vertical milling machines.

Name_____
Title_____
Company_____
Address_____
City_____ Zone____ State_____

PHOTO COURTESY WEIRTON STEEL COMPANY, WEIRTON, WEST VIRGINIA

# Breaking the "capacity barrier" starts here...

How can you produce enough hot metal to meet today's record-breaking schedules?

You know, for instance, that you get more out of the new higher grade ores. But you can also increase production regardless of ores by using better quality coke.

Island Creek coals, with their low ash and sulphur content . . . and excellent coking properties . . . enable your coke plant operators to furnish the improved coke that results in more iron . . . even cuts the cost per ton of iron produced.

This is more than a theory. It's being done . . . by leading producers who depend on Island Creek as a major source for quality coking coals.

We'll leave the rest of the story, the technical side, up to Island Creek coking coal specialists. They'll welcome an opportunity to discuss it with you.

YOU CAN DEPEND ON

*Island Creek*

*Island Creek coals are ideal, too, for industrial steam production.*

**COKING COALS**

**ISLAND CREEK COAL SALES COMPANY, Chafin Building, Huntington 18, West Virginia**

Chicago • Cincinnati • Cleveland • Detroit • Greensboro • New York • Pittsburgh

# Norton Opens Plant

**Santa Clara, Calif., facility will produce a complete line of grinding wheels**

NORTON CO officially opened its grinding wheel plant at Santa Clara, Calif. Products: A complete line of grinding wheels, including the diamond type.

The latest developments in the industry have gone into the facility, including many pieces of equipment and methods developed at

Norton's main plant in Worcester, Mass. Typical are: Electric tunnel kilns which have automatically controlled temperatures during firing; automatic molding machines which insure the uniform size and density of small diameter wheels; dust control equipment; and modern handling devices.

**Good Environment**—Lighting is 40 to 60 foot-candles at the working level. This feature, combined with restful color combinations, eliminates glare and contributes to excellent working conditions.

The accompanying photo shows grinding wheels being prepared for shipment. Overhead chutes contain sawdust, used to protect wheels in transit.

George A. Garrison is manager of the plant.

## Westinghouse To Build

Westinghouse Electric Corp. will build a multimillion dollar plant near Bloomington, Ind., for the manufacture of switchgear distribution apparatus. Construction is scheduled to begin late in 1956. Production change-over from the distribution apparatus department now in the East Pittsburgh plant will begin in late 1957. F. F. Herman has been named manager of the Bloomington plant.

## Bliss Enlarges Facilities

E. W. Bliss Co.'s West Coast Division has doubled facilities at its Southern California branch at 816 N. Hollywood Way, Burbank, Calif. Manufacturing facilities have been installed for assembly of standard die sets. Previously, most sizes of die sets were shipped to the Southern California area from the Bliss manufacturing plant at San Jose.

## Torrington Buys Fastener Firm

Torrington Co. purchased Progressive Mfg. Co. Both are Torrington, Conn., firms. Progressive's products include machine screws, nuts, bolts, rivets and related types of fasteners. Torrington's products range from knitting, sewing machine and surgeon's needles to swaging machines and antifriction bearings.

## Mid-West Forging Expands

Mid-West Forging & Mfg. Co., Chicago Heights, Ill., completed a $100,000 addition to its plant. It adds 10,000 sq ft of warehouse and production facilities.

## Electromet Forms New Unit

As a step in expanding its development program for new products, processes and markets for ferroalloys, metals and metal compounds, Electro Metallurgical Co., a division of Union Carbide & Carbon Corp., New York, has established a product and process development department. The department has extensive facilities at Niagara Falls, N. Y. Its scope: Development work in open arc smelting and production, vacuum technology, submerged arc smelting, chemistry and electrochemistry, electrothermics and pyrometallurgy, particle technology, hydrometallurgy and engineering development. E. F. Doom is director of the department; Paul McVicker, general manager; E. J. Boyle and R. K. Kulp, assistant managers.

## Titanium Flows from New Plant

Electro Metallurgical Co. has initiated operations at its titanium reduction plant near Ashtabula, O. The plant is expected to reach full rated capacity of 7500 tons a year by the fourth quarter. The plant uses sodium, instead of the more conventionally used magnesium, to reduce titanium tetrachloride.

## Installs Annealing Furnaces

Rising demand for silicon steel has resulted in a substantial increase in facilities for the production of this grade. Loftus Engineering Corp., Pittsburgh, recently installed ten cover-type annealing furnaces with 27 bases at the Vandergrift Works of U. S. Steel Corp.

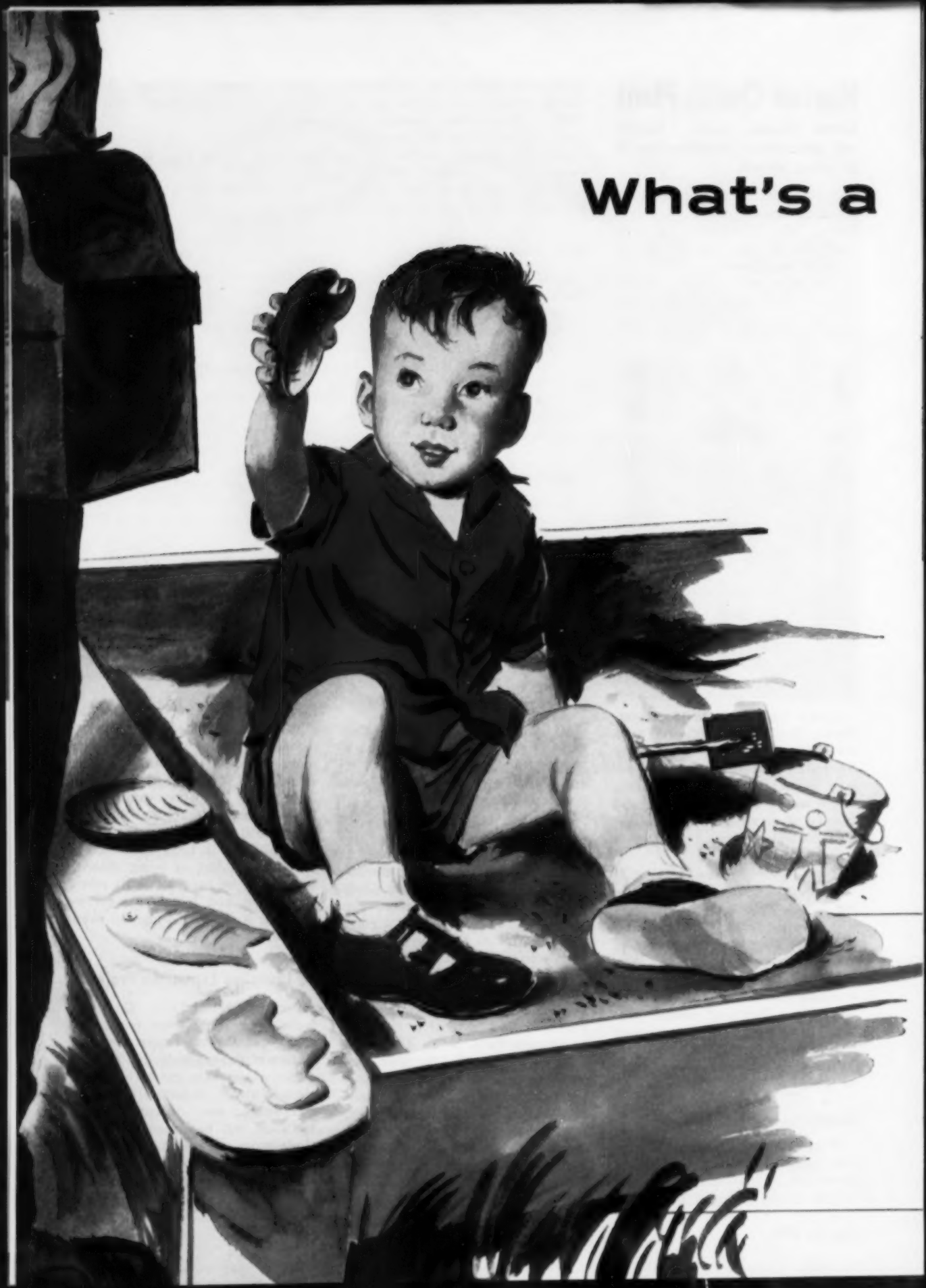
## Intensifies Missile Research

Ford Instrument Co., a division of Sperry Rand Corp., Long Island City, N. Y., organized a Missile Development Division. The company makes the guidance system for the Army's Redstone missile. The expansion move is designed to increase engineering and test facilities for the Redstone and to develop guidance systems for the more advanced ballistic missiles. In addition, a new gyroscope test laboratory is being established. Manufacture of parts and final assembly will be handled in the firm's two buildings in Long Island City. A third building is being leased, which will be provided with additional test and laboratory equipment, as well as experimental shop machine tools.

## GE Launches Expansion Project

General Electric Co. has launched a $6.8-million expansion of its gas turbine department facilities at Schenectady, N. Y. The department makes gas turbines for electric utility, industrial, railroad and marine use. Manufacturing facilities will be expanded to include more of the large machine tools required to manufacture GE's new line of gas turbines. A

(*Please turn to page* 100)


What's a

# SPOMATIC, daddy?

"A SPOMATIC, son, is a big machine. It makes sand molds...just like you're doing. But it makes hundreds in an hour. And it does it all day long...all automatically. Another fellow and I run one at the foundry. It's easy!

"Actually, it is more than just a machine. It's a whole new system in itself. This one machine...this SPOMATIC...does more work in one day than a dozen ordinary machines. That's why my boss says it is the biggest money-maker in the business.

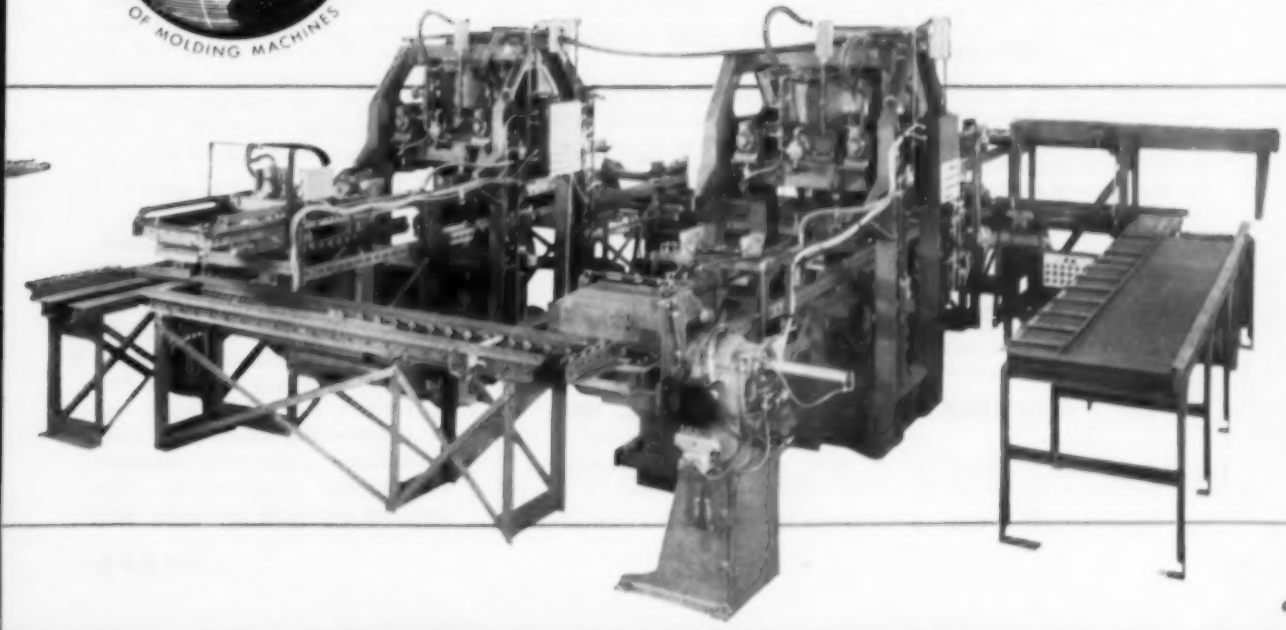
"Try to beat the SPOMATIC's performance if you want to, son, but remember...*there isn't a foundry molding machine in the world that can!*"

WORLD'S LARGEST SUPPLIERS SPO OF MOLDING MACHINES

**SPO INCORPORATED**

6494 GRAND DIVISION AVENUE
CLEVELAND 25, OHIO

*Write For Bulletin "MM For Details.*



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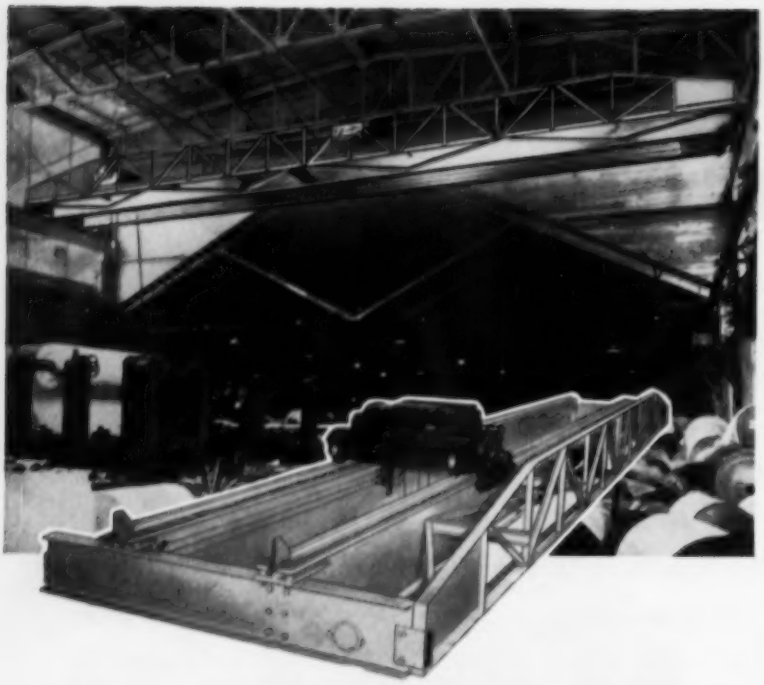


# YOU SAVE THREE WAYS
## WITH A CRANE LIKE THIS

Series "D" 'Load Lifter' Cranes are economical to buy, use and maintain. They are built in 1 to 20-ton capacities to meet average industrial needs, but mass production methods make them available at prices substantially lower than other cranes for the same services.

Series "D" 'Load Lifter' Cranes incorporate operational features found on only the most expensive cranes. They utilize modern construction techniques and components that eliminate needless dead weight and drag. They do not whip or skew. Consequently, whether the span is 20 feet or over 50 feet, high performance is coupled with low power consumption.

Maintenance is never a costly problem with Series "D" Cranes. All gearing operates in oil in sealed housings. Anti-friction bearings minimize wear. Rotating axles carry the bridge and trolley wheels. Long wheel bearing life is assured.

Series "D" 'Load Lifter' Cranes have positive magnetic control: push button on floor-controlled cranes; master switches on cage-controlled cranes. Whatever size, type, trolley style or span you require, you can order what you want from Catalog 221. Write for a copy and learn how much you can save with a Series "D" 'Load Lifter' Crane.

MAXWELL MANNING & MOORE INC. TRADE MARK

'Load Lifter'® CRANES

MANNING, MAXWELL & MOORE, INC.
MUSKEGON, MICHIGAN

Builders of "SHAW-BOX" and 'LOAD LIFTER' Cranes, 'BUDGIT' and 'LOAD LIFTER' Hoists and other lifting specialties. Makers of 'ASHCROFT' Gauges, 'HANCOCK' Valves, 'CONSOLIDATED' Safety and Relief Valves, 'AMERICAN' and 'AMERICAN-MICROSEN' Industrial Instruments, and Aircraft Products.

(*Concluded from page 97*)

headquarters building adjacent to manufacturing operations is planned.

### Carborundum Widens Research

Carborundum Co., Niagara Falls, N. Y., will expand its annual research budget by almost $2 million. The company will increase its central laboratory staff and purchase special equipment for research in ceramics, chemistry, physics and metallurgy.

### Crucible Forms New Division

Crucible Steel Co. of America, Pittsburgh, has formed a division for the fabrication and sale of steel springs. The Spring Division combines all of Crucible's spring fabrication and sales activities, including the Spring Works and the Railroad & Spring Sales Division. Thomas T. Crowley is general manager of the division.

### Ford Enlarges Canadian Plant

Ford Motor Co. of Canada will add four acres of space to its Oakville, Ont., plant for passenger car assembly lines. The project will cost $4 million. Progress is being made on plans for an $8-million head office project, but the site has not been chosen.

### Allied Products Buys Plant

Allied Products Corp.'s Richard Bros. Punch Division, Detroit, acquired a plant at 25800 Groesbeck Highway, Roseville, Mich. It will provide additional production of the firm's interchangeable punches, die buttons and related products. Manufacturing facilities in Milwaukee have been moved into the new plant.

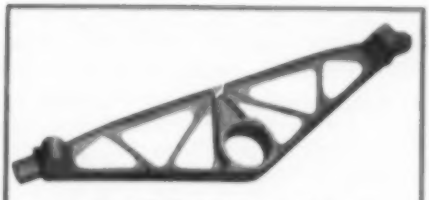
### Copeland Refrigeration Expands

Copeland Refrigeration Corp. is adding nearly 500,000 sq ft of manufacturing and administrative space to its facilities in Sidney, O. The first unit will be a 250,000-sq-ft plant for refrigeration and air conditioning compressor manufacturing, engineering research and product development. The company plans to maintain some

*Two-stage oil pan, 29" long, 11" wide, 13" deep, for military trucks; produced as stampings by T & W TECHNIQUE. Inset shows main stamping before trimming.*

# T&W TECHNIQUE can save production dollars for you

● If you buy stampings or forgings, then you want to know all about T & W Technique. Benefits from T & W Technique come to you in many ways — in effective design and engineering service, in extra skill which completes hard-to-produce parts without delay, in quality control, in delivery on schedule. But, always, forgings and stampings from T & W are likely to meet your needs so well that they cost you less at the point of assembly.



*T & W Technique provides you with forgings like this fulcrum, as well as stampings, which meet your needs better, help you save production dollars.*

STAMPINGS
**T&W**
FORGINGS

**TRANSUE & WILLIAMS**

*Over 50 years of experience*

*Sales Offices:*

NEW YORK • PHILADELPHIA • CHICAGO • INDIANAPOLIS
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**TO: Transue and Williams, Alliance, Ohio**

Please let me know what "T & W Technique" can do for us. We are interested in

☐ Forgings ☐ Stampings

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Company _____

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**T & W DEEP DRAWN STAMPINGS AND FORGINGS USUALLY COST LESS AT THE POINT OF ASSEMBLY**

ARDCOR

selects dependable, easy-to-maintain H&S speed reducers to drive giant mills.

Designed to roll form steel roof decks and flooring by American Roller Die Corp., this mill is 180 feet long and weighs 300 tons. It rolls up to 90 fpm and is fed by 12,000 lb. steel coils.

H & S speed reducers are key units in this Ardcor mill's main drive system. An eight speed H & S transmission equipped with Sykes Herringbone Gears and accurate shifting mechanism is coupled by high speed shafts to pinion stands. These H & S roll drives feature a combination of worm and helical gearing. The helical gears have a ratio of 1-1 with roll shafts.

Years of experience prove that *rugged construction* and *ample overload capacity* of H & S products assure trouble-free service and operating economy. If you have a power transmission problem, we'll be glad to help you. With our complete lines to choose from, you're assured of our unbiased recommendation. Contact your H & S representative, or write us today.

THE HORSBURGH & SCOTT CO.
GEARS AND SPEED REDUCERS
5112 Hamilton Avenue
Cleveland 14, Ohio

Send note on Company Letterhead for complete H & S Catalog

of its present facilities in Sidney for manufacturing, subassembly and material storage.

## Dixie Pipe & Foundry To Build

Dixie Pipe & Foundry Co., Pell City, Ala., will build a plant for the production of plumbing appliances, such as bathtubs, sinks and fittings. It will have 40,000 sq ft of floor space and cost between $2.5 million and $3 million. Operation of the soil pipe plant will be continued.

## Huge Press Starts Operations

A hydraulic forging press capable of applying a force of 8000 tons is in operation at the Vernon (Calif.) Works of Aluminum Co. of America. A 1500-ton press was put into production at this plant last August. Large precision aircraft forgings of the close tolerance, low draft type will be an important product of the new equipment.

## U. S. Industries Buys Firm

U. S. Industries Inc., New York, acquired A-1 Bit & Tool Co., Houston, manufacturer of special tools and valves used in the drilling and testing of oil wells. The property will be operated as a branch of Garrett Oil Tools Inc., a division of U. S. Industries.

## Enters Fabricating Field

T.I.W. Western Ltd. has been organized by Toronto Iron Works Ltd. and Canadian Kellogg Co. Ltd. The new company will incorporate the former Kellogg manufacturing shops in Edmonton, Alta., which were set up for the fabrication of processing equipment and piping. Toronto Iron Works will service its western customers through the new company by fabricating steel storage tanks and various lines of steel and alloy steel plate products. All fabricating services introduced by Kellogg will be continued, and present facilities in Edmonton will be expanded to permit the fabrication of the additional products for Toronto Iron Works's western clients.

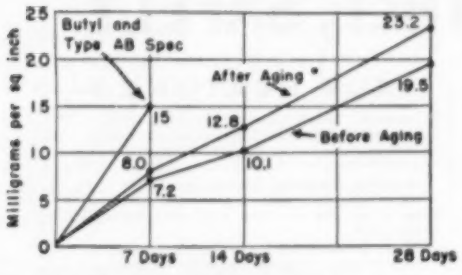
Officers of the new company

**Amazing moisture resistance** of Anaconda's Type AB butyl high-voltage insulation helps reduce failure due to moisture.

## When you can't keep cable out of moisture

# New insulation keeps moisture out of cable

**Exceptional moisture resistance is provided by Anaconda Type AB butyl insulation.**




**RESULTS OF** mechanical moisture absorption test show Type AB retains good moisture resistance even after aging.

Where rubber-type cable is installed in underground ducts or buried directly in the earth, the moisture-resistance properties of the *insulation* are vitally important.

Latest facts show *Anaconda's Type AB butyl high-voltage insulation absorbs far less moisture* than industry standards permit. For the mechanical moisture absorption test, the industry has regarded 15 milligrams increase in weight per square inch of exposed surface, after 7 days' immersion at 70C, as a criterion for satisfactory moisture resistance. Type AB easily meets that requirement – in fact, typical results show it absorbs less than 7.2 mg. in 7 days.

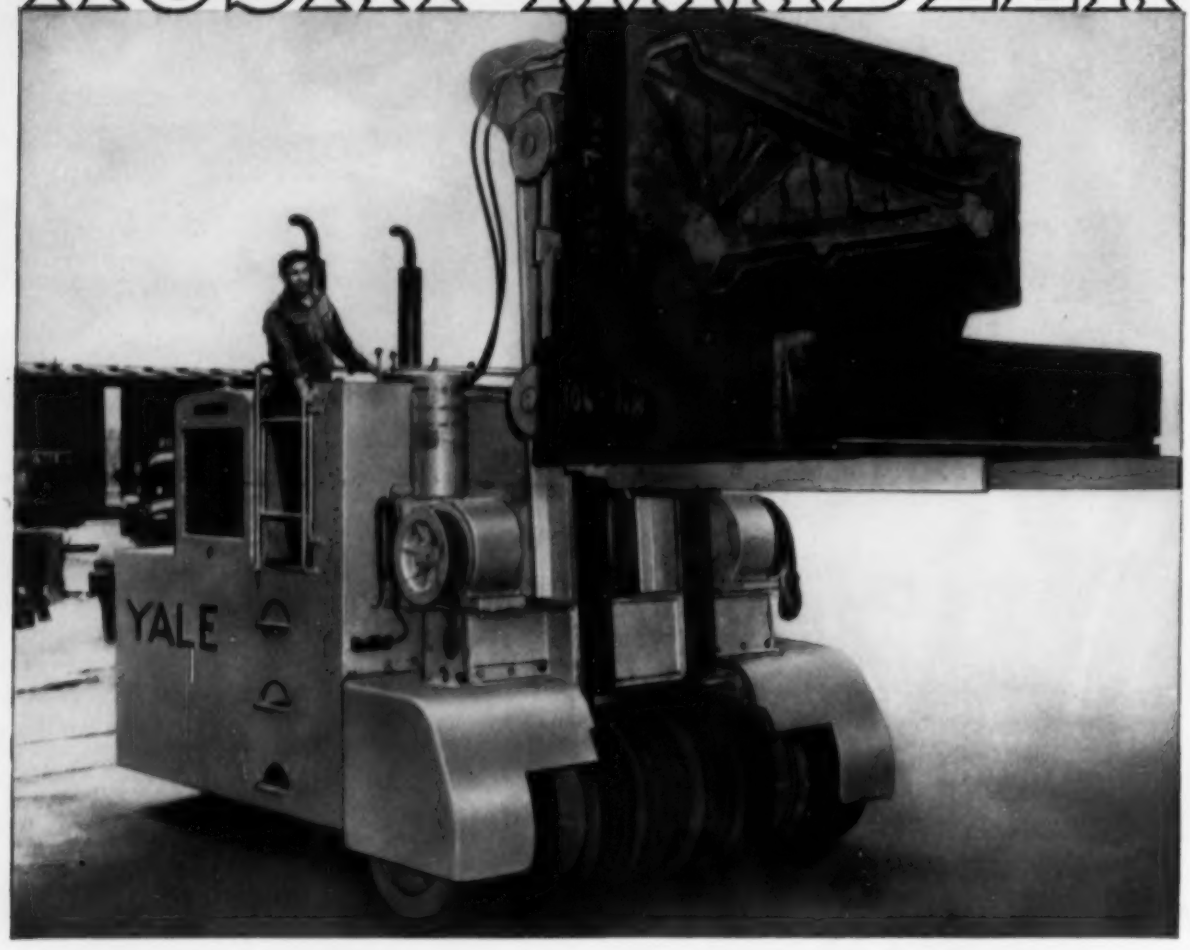
**New Engineering Bulletin EB-27** gives you full details on performance of Type AB insulation in 15 Industry Specification tests. Ask the Man from Anaconda for your copy. Or write: Anaconda Wire & Cable Company, 25 Broadway, New York 4, N. Y.

**Get all the facts on Anaconda butyl. Write today –**

**ASK THE MAN FROM ANACONDA®**

**–PIONEER IN BUTYL INSULATION**

# HUSKY HANDLER




## 30-TON CAPACITY YALE TRUCK HANDLES MASSIVE LOADS SMOOTHLY, SAFELY

Yale Giant Handlers answer the need in the metals industry for lift trucks that move bulky, one-unit loads efficiently, safely—and fast! Proof is in the picture: One man...a multi-ton die...minimum effort because Yale features allow the operator to move loads faster, maneuver the truck in congested areas easier and spot loads more accurately. Every phase of this handling operation is smooth...free from handling shocks which cause operator fatigue and dangerous load shifting.

Yale Giant Handlers come in capacities from 20,000 to 100,000 lbs. For detailed information about other Yale Electric Trucks, write The Yale & Towne Mfg. Co., Philadelphia 15, Pa., Dept. 85.

### YALE FEATURES

**Automatic Speed Control:** Magnetic contactor type drive controller with time delay provides smooth acceleration through all four speeds either forward or reverse.

**Maximum Visibility:** Narrow spread of uprights plus dual drive controls for operation on either side of truck give extra forward visibility.

**Power Steering:** With a follow-up control so that handle indicates direction of steering wheels as a guide for maneuvering in congested areas.

**Minimum Overhang:** Short distance between load center and load wheels allows a shorter, more compact truck design, thus providing a short turning radius and easy maneuverability.

**YALE*** **INDUSTRIAL LIFT TRUCKS AND HOISTS**

*REG. U. S. PAT. OFF.

**Gas, Electric, Diesel & LP-Gas Industrial Trucks • *Worksavers* • Warehousers • Hand Trucks • Hand and Electric Hoists**

are: President, G. E. Ellsworth; vice presidents, Benton Dixon and D. W. Champlin; secretary-treasurer, R. A. Baggott; assistant secretary-treasurer, E. L. Gidley; assistant treasurer, W. W. Hummel. R. T. Valentine is general manager.

### Refractory Firms Merge

Niles Fire Brick Co., Niles, O., National Refractories Co. Inc., Van Dyke, Pa., and Big Savage Refractories Corp., Frostburg, Md., have merged with Mexico Refractories Co., Mexico, Mo. They will be operated as divisions of Mexico Refractories which is building its fifth tunnel kiln at its main plant. It and a new calcining kiln completed this year will increase capacity of the Mexico plant more than 20 per cent.

### Rem-Cru Opens Sales Offices

Rem-Cru Titanium Inc., Midland, Pa., opened sales offices in New York and Chicago. Ralph J. Kotfila will represent Rem-Cru in the Midwest and will have offices at 4501 W. Cortland St., Chicago 39, Ill. P. J. Cambourelis will represent the firm in the East, with offices at 405 Lexington Ave., New York 17, N. Y. In addition, the Rem-Cru sales engineering staff has been increased at the firm's general office.

### Jaquith Carbide Changes Hands

Pratt & Whitney Co. Inc., West Hartford, Conn., purchased Jaquith Carbide Die Corp., Lynn, Mass., and will operate it as the Jaquith Carbide Division. The Jaquith plant will be enlarged immediately. Edwin Jaquith will continue to direct the division's activities as vice president and divisional general manager.

### British Firm Boosts Capacity

Production of steel ingots in the Templeborough melting shop of Steel, Peech & Tozer, Rotherham, a branch of United Steel Companies Ltd., Sheffield, England, will be raised by more than 30 per cent as the result of a furnace rebuilding program. The capacities of 14 open-hearth furnaces have

. . . *and* THIS CHECK
*is valuable too!*

TRI-ROLL
THREAD
Comparators

*produced*
ONLY *by*
PRATT & WHITNEY

When it comes to checking external threads, a P&W Tri-Roll Thread Comparator can save valuable time and increase your profit margin by reducing inspection costs. But fast, easy operation is only part of the story. *Only* Tri-Roll gives you a complete, visual analysis of lead, angle and pitch in one operation . . . *plus* a direct reading of out-of-roundness by rotating the work. *Only* Tri-Roll offers an alternate, critical check of pitch diameter by using two-rib rolls. And ONLY PRATT & WHITNEY can offer you Tri-Roll Thread Comparators with all their advantages of dependability and economy.

SEND NOW FOR COMPLETE INFORMATION – WRITE FOR YOUR FREE COPY OF CIRCULAR NO. 570
(It's fully illustrated, of course.)

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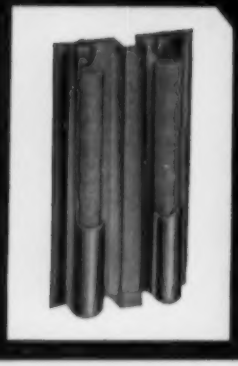
INCORPORATED
13 Charter Oak Boulevard, West Hartford 1, Connecticut
*Direct Factory Representatives in Principal Cities*

MACHINE TOOLS • GAGES • CUTTING TOOLS

KEYSTONE SPRING WIRE

SASH SPRING
COSTS CUT!



Shaffer Sash Spring Co.
Des Plaines, Illinois
reports . . .

*Long life—satisfied customers . . . and 50% lower production costs!* These are the gains Shaffer Sash Spring Co. reports, using Keystone Spring Wire. Each year they supply millions of balance springs used in the manufacture of spring loaded window sash. Keystone Wire is standard for good reasons. Most important, Shaffer keeps their customers satisfied by producing a precision, high quality spring. There have been no fatigue failures since the first shipments of springs made of Keystone Wire. Perfect forming characteristics of Keystone Wire have enabled them to increase production and lower costs by 50%. That's because of Keystone's unique method of cold drawing *after* galvanizing. Coating is dense and smooth. Forming is consistent—free from flaking.

SEE YOUR KEYSTONE WIRE SPECIALIST

Keystone does not make springs . . . but does supply many leading companies with quality Spring Wire for better springs, lower production costs . . . and satisfied customers. High carbon and manganese steel spring wire—hard drawn, spheroidized annealed and music wires—are available in Keystone quality to match your spring needs. Also wire for Cold Heading and other industrial uses. Your inquiries are invited!

KEYSTONE STEEL & WIRE COMPANY, Peoria 7, Illinois

KEYSTONE WIRE for Industry

been converted from 80 to 100 tons each. In 1952, the last full year before the program started, 594,027 tons of steel were produced by this shop; this year, output is expected to reach 800,000 tons.

### Hyster Plans Illinois Plant

Hyster Co., Portland, Oreg., manufacturer of industrial lift trucks and tractor equipment, will construct a new plant in Danville, Ill., and will expand its factory in Peoria, Ill. On completion, the new plant on E. Voorhees street, Danville, will have several factory units. Plans call for production to continue at the Myers street plant. The $150,000 expansion project in Peoria will add about 25,000 sq ft to plant facilities.

### Caterpillar Plans Expansion

Aurora, Ill., has been chosen as the site for a new plant of Caterpillar Tractor Co., Peoria, Ill. It will be used for production of crawler tractors and tractor shovels. Additions will be built to the company's plants in Decatur and Joliet, Ill., and additional machinery will be installed at other plants under a four-year program.

## NEW ADDRESSES

**Marble Cliff Quarries Co.** moved to 2100 Tremont Center, Columbus 21, O.

**American Chain & Cable Co. Inc.,** Bridgeport, Conn., opened new facilities at 2250 Noblestown Rd., Pittsburgh 5, Pa. They will house district sales offices for these divisions: American Cable, American Chain, Ford Chain Block, Hazard Wire Rope, Pennsylvania Lawn Mower, R-P&C Valve and Wright Hoist. American Cable and Hazard Wire Rope divisions will maintain warehouse stocks. Messages will be accepted for Allison, Campbell Machine, Helicoid Gage and Wilson Mechanical Instrument divisions.

**Clipper Diamond Tool Co. Inc.** moved to larger quarters at 345 Hudson St., New York 14, N. Y.

**Oil-Free Chemical Grinding Compound Prevents Wheel Loading, Fights Rust**

# HOUGHTO-GRIND

Houghto-Grind keeps finishes free from grinding cracks and burns caused by wheel loading because Houghto-Grind's high detergent action keeps grinding wheels clean. Freshly ground surfaces won't rust because they are protected by Houghto-Grind's corrosion inhibiting properties. With Houghto-Grind, the operator can see the work 100 percent of the time. This fluid is absolutely transparent, enabling close and continuous observation when grinding to exact tolerances.

Easy to use, Houghto-Grind mixes with water at room temperature, providing a long-lasting, non-foaming, permanently stable solution. Because there is no oil in it, there is no disposal problem. It will not pollute streams or rivers. Even in periods of prolonged use, Houghto-Grind is free from rancidity or unpleasant odors. A special germicide retards the growth of living organisms that might cause poor health and safety conditions.

Your Houghton man will gladly give you complete details about how you can take profitable advantage of Houghto-Grind's efficiency, economy, transparency and rust-preventing properties. Call him today, or write E. F. Houghton and Company, 303 W. Lehigh Ave., Philadelphia 33, Pa.

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*Ready to give you on-the-job service ...*

**HOUGHTON PRODUCTS FOR THE STEEL INDUSTRY**

| Hydraulic Fluids | Rust Preventives | Grinding Compounds | Special Purpose Lubricants | Heat Treating Materials | Cutting Oils and Bases | Leather and Synthetic Rubber Packings | Pickling Inhibitors |
|---|---|---|---|---|---|---|---|

Sperry

# ultrasonic inspection news

## 40-FOOT ALUMINUM EXTRUSIONS INSPECTED UNDER WATER

**How to inspect** 40-foot, 1850-lb. aluminum extrusions for internal defects, prior to machining into helicopter blades? – Piasecki Helicopter Corp., Morton, Pa., required an immediate answer to this problem.

**The solution** was provided by Sperry Products' Commercial Testing Service. At Sperry's Danbury laboratory personnel and equipment were available, including a 100-foot tank which would permit ultrasonic immersion inspection of the huge extrusions.

**To best meet your individual inspection requirements,** Sperry Products Commercial Testing Service offers you complete ultrasonic testing laboratories in Danbury, Pittsburg and Chicago. Convenient in-your-plant inspection service is also available from these offices, as well as from Sperry Sales Offices in Boston, New York, Philadelphia, Atlanta, Houston and Los Angeles. Sperry Western, Inc., Lafayette, La., offers its specialized experience to the Oil Field Industry.

**Actual inspection** was accomplished with a Sperry UW Reflectoscope and a PH Positioner equipped to hold the search head at a constant distance from the section. These instruments were mounted on an electric car which also carried the operator. Straddling the immersion tank, the unit was capable of testing at speeds ranging from 2 feet to 32 feet per minute. To perform a complete inspection, covering the 31 inch width, including fillets, required a total of 117 longitudinal passes over each extrusion.

sperry products INC.

FIRST IN ULTRASONIC INSPECTION

To keep posted on latest developments in the profitable use of ultrasonic inspection by industry send for your copy of our new Ultrasonic Inspection News Letter.

Sperry Products, Inc.
605 Shelter Rock Road
Danbury, Connecticut

- ☐ Send me Commercial Testing Service information.
- ☐ Send me the Ultrasonic News Letter.
- ☐ Send me Reflectoscope information.

*Name* _____

*Title* _____

*Company* _____

*Address* _____

*City* _____ *Zone* ___ *State* _____

STEEL
May 21, 1956

# Technical Outlook

**FOR HEAT BARRIER**—International Nickel Co. has two new high temperature alloys: 1. Inconel "700" — an age hardenable nickel-cobalt-chromium alloy. 2. Incoloy "901" — a nickel-iron-chromium alloy. Uses will be in aircraft and industrial gas turbine applications. Inconel "700" keeps its strength in blades up to 1650°F. Having lower strategic alloy content, Incoloy "901" will be used in turbine rotor and compressor discs and structural parts in the intermediate range of 1000 to 1400°F.

**WEST'S GIANT PRESS**—An 8000-ton hydraulic press is turning out aircraft forgings at Alcoa's Vernon (Calif.) works. The largest press to go West, it was built by Schloemann A.G. of Dusseldorf, Germany. A unique feature of the installation: It's earthquake-proof.

**HIGH-TEMP BRAZE**—Molybdenum boride is being used to braze molybdenum, tungsten, tantalum and columbium, especially in electronic parts. The boride melts at 3450°F, but the joint will withstand higher temperatures.

**STRETCH CHECKER**—It's sometimes critical, particularly in aircraft, to get bolts tightened properly—not too much, not too little. A new air gage, made by Sheffield Corp., Dayton, keeps track of bolt tension by measuring how much it stretches. The operator tightens the bolt until a float on the gage reads zero.

**NYLON MANDRELS**—Engineers at Douglas Aircraft have developed nylon mandrels for tube bending. They are machined from Polypenco rod stock supplied by the Polymer Corp. of Pennsylvania, Reading, Pa. A segmented-ball mandrel, 1-in. OD, costs about one-third as much as its steel counterpart. In addition, it can be made at Douglas in about 5 hours. Segmented mandrels are made up of a number of discs or ball-shaped segments with a center hole. A flexible steel cable is threaded through these segments to form the complete mandrel.

**BETTER CONTROL**—The Investment Casting Institute has issued seven new material specifications to help design engineers and other persons specifying investment cast parts. They cover: Carbon steels, low alloy steels, magnesium, heat treatable aluminum, corrosion and heat resistant cobalt and nickel-base alloys, and silicon brass.

**REJUVENATE CHROME BATHS**—A patented process for ion exchange treatment of chromic acid plating and anodizing solutions is available for industrial use without a formal license, reports Mutual Chemical Division, Allied Chemical & Dye Corp., New York. The process permits recovery of baths that become inoperable and solves the waste disposal problem. Quality of plated and anodized work is improved by the removal of metallic contaminants from the bath in the decationizing process.

**HIGH-TEMP LUBE**—New, fully automatic lubricating systems will take temperatures up to 500°F. They were developed by Bijur Lubricating Corp. The company reports the systems use newly designed valves and filters that combine heat-resistant qualities with desired filter and flow control. Filters are sintered bronze, have a density equivalent to an SAE F-10 felt filter.

*Metalworking Outlook—p. 63* *Market Outlook—p. 161*

X 5 Nital

This sintered iron gear tooth has been etched to show the varying amounts of combined carbon. Note that the surface is decarburized

# How Metallography Helps Sintering

"TURN to the metallographer," is good advice for the sintered metal producer with a problem.

A manufacturer using a transmission gear made of a copper-infiltrated, sintered-iron alloy did. Noise and broken gear teeth had plagued his product. He needed to combine advantages of sintered and solid steel gears. To meet competition on costs, he had to stay with the sintered material.

**No Help** — The manufacturer's first task was to find out how the faulty gears differed from the original samples. But no evidence was uncovered by regular tests (density determinations, crush, hardness, size measurements and chemical analyses).

The easy solution was to specify an alloy with more strength, wear or shock resistance, but such a move often leads to higher costs.

A metallographer was called in. He found that poor briquetting produced unpredictable strength and that a decarburizing atmosphere in the sintering furnace left a soft ferrite surface. To overcome these, the manufacturer was using an unnecessary copper infiltration. The metallographer showed him how to eliminate infiltration and produce a stronger gear.

By RICHARD B. THOMSON
and ARTHUR B. WENDT
United States Graphite Co.
Division of Wickes Corp.
Saginaw, Mich.

**Solution**—His first step was to section both good and bad gears. Above is a macrograph of a tooth section of a poor gear. The light portion around the outside surface of the tooth is the decarburized skin. Fig. 1 shows the structure of this area. It is composed of ferrite, with remnants of pearlite and free cementite, plus infiltrated copper—not a good structure for wear resistance. The dark line just inside the decarburized skin of the tooth (above) is pearlite, which is tough and fairly hard. It also contains infiltrated copper.

The interior of the tooth is a pearlitic matrix with a cementite network. In addition, there is some free ferrite and infiltrated copper.

The important observations: If a surface of soft ferrite is formed on the skin, the gear teeth will wear excessively. Hard cementite in the interior presents other complications.

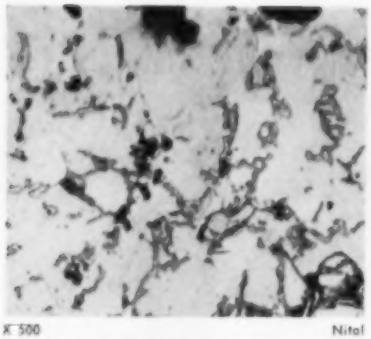
**Brittle** — In Fig. 2, the white stringers surrounding the pearlite grains are cementite. Cementite is extremely hard and brittle. The amount here increases machining problems. Such a brittle section may rupture as a result of shock loading.

The blank material was sintered in a decarburizing atmosphere. Machining operations took off all of this decarburized surface, leaving a structure composed of pearlite or pearlite plus cementite. The pearlitic structure gives one of the best combinations of hardness, toughness and wear resistance; the machined gears tested O.K.

It is not always possible to detect combined carbon deficiency by chemical analysis. Undissolved graphite may be present, so the usual quality control test for sintered parts did not detect this condition. With metallography, the decarburized condition could have been detected and corrected.

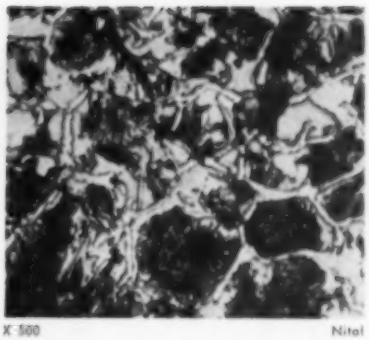
**More**—This gear had to be copper infiltrated to improve strength and shock resistance. Sections of the gear teeth were examined to determine the amount of copper infiltration. In Fig. 3, the copper is the gray areas. The black spots are either oxide inclusions or infiltrated pores.

Compare Figs. 3 and 4. Notice the considerable difference in porosity from one section to the other in one tooth. In Fig. 4 there



X 500 Nital

1 This is a closer look at the tooth surface. The absence of pearlite makes it soft and weak, reduces wear resistance



X 500 Nital

2 The interior of the same gear tooth has too much cementite surrounding the pearlite. It is too hard and brittle

is much less infiltrated porosity than in Fig. 3.

It follows that the less the porosity, the higher the density; the more density, the greater the strength. The strength of this gear tooth varies as a result of varying density. This is undesirable. Proper care in briquetting will eliminate it.

**Variation**—Figs. 3 and 4 show that the sintered metal producer could not make gears with a consistent density or high enough strength. He made up for this by copper infiltration. Copper increases the tensile strength of sintered iron briquettes.

A closer study shows that there is no need for such a density variation. It should be possible to omit the copper infiltration. This would cut the cost considerably.

The metallographer found the cause of this problem and determined what structure would be most desirable. Figs. 5 and 6 show the results. This is a copper infiltrated material to the extent shown by the white areas. The matrix structure is almost totally pearlitic—a tough, reasonably hard material which is not too brittle.

The same section is shown in Fig. 6. The fine pearlitic structure is clear.

**Blueprint** — The final step is to make the microstructure a qualifying specification. A metallurgist accustomed to solid materials will automatically revert to a hardness specification in addition to chemical composition limits. Such tests can be misleading when applied to sintered materials.

Sintered materials are porous by nature. The location of the point on the hardness tester (whether the point is in a pore or on the metal particle itself) will cause variable readings. A hardness specification can be used, but it should be only a guide.

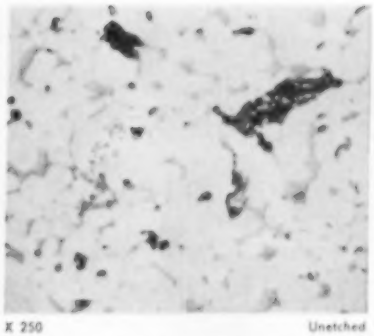
Density is important. The most desirable test is breaking a critical section and establishing a minimum allowable breaking load. Rely on density, hardness and the breaking strength of the production part.

Where wear resistance is critical, those tests should be supplemented by a specification for the combined carbon content. Although you can determine the combined carbon content chemically, a metallographic estimate is better.

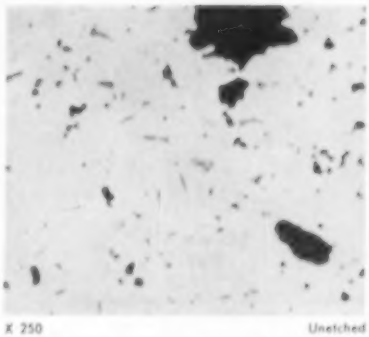
**Precaution**—Before you confirm final specifications, consider: First, most sintered iron parts are soft ferrite. Sizing or coining ferrite parts is common practice. Second, don't try to coin a pearlitic type iron. Pearlitic is harder and tougher than ferritic iron. Ferritic iron works better for close tolerance parts. If close tolerances aren't necessary, obtaining the proper structure should be easier.

Where close dimensions are not a problem, metallography reveals a wealth of possibilities. For example, refer to ASTM Specification B202-51T, Type 2, Class A and B. A number of alloys are substantially stronger. The most important factor in carbon control is the effect of increasing wear and shock resistance.

**Consultation**—If you can't afford your own metallographer, there are many reputable consulting firms and laboratories. A change in your specifications may save the fee many times over.

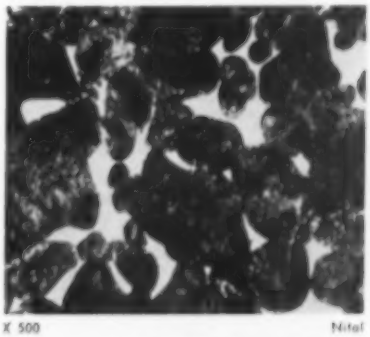


X 250 Unetched

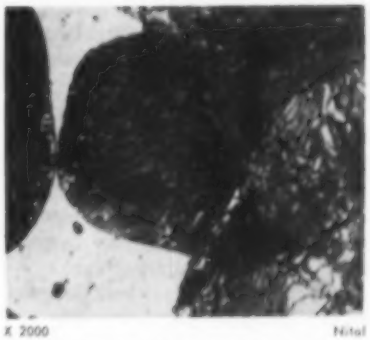


X 250 Unetched

3 & 4 Compare these photomicrographs. Both are from different batches of the same gear. Dark areas are copper; the darkest areas are oxide inclusions or infiltrated pores. Variations are from poor briquetting control

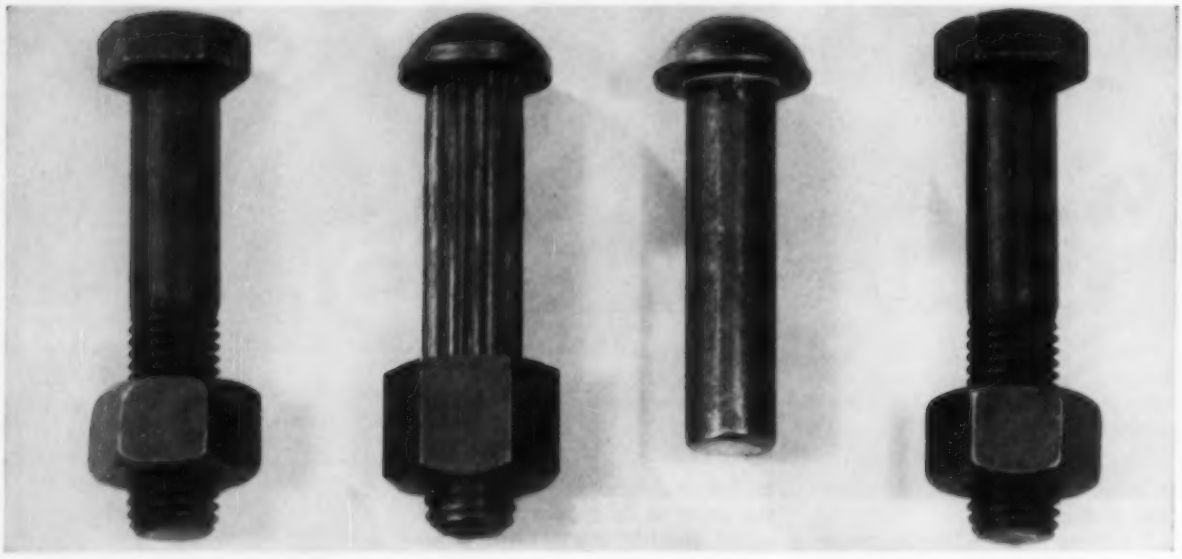


X 500 Nital



X 2000 Nital

5 & 6 An ideal structure for a gear. Light areas are infiltrated copper. The enlargement (below) clearly shows the pearlite structure of the grains



Standard Bolt | Dardelet Rivet-Bolt | Hot-Driven Rivet | High Strength Bolt

# Structural Fasteners: Four To Choose From

By JOHN B. SCALZI
Associate Professor of Structural Engineering
Case Institute of Technology
Cleveland

HERE ARE FOUR structural fasteners. When do you use which?

The standard unfinished bolt is for small structures where members are lightly loaded in a steady state—such as connections for girts, seated purlins and one-story buildings. The rivet maintains its importance as a major connector for shop fabrication, although welding challenges its position.

The high strength bolt is rapidly achieving supremacy for field erection. As a field connector, it has progressed by leaps and bounds since the first specification was approved in 1949.

**Advantages**—This bolt has all the desirable characteristics of the hot-driven rivet without requiring a four-man crew and heating and driving equipment. It requires only two men using an impact wrench and a holding wrench.

The Dardelet rivet-bolt is preferred by some engineers and designers because it provides a body-bound fit and has little slip under the action of moving and changeable loads. It has advantages in the erection of heavy crane structures, and in connections which are inaccessible for riveting or for torquing high strength bolts.

**How to Choose**—The best choice is the most economical fastener which will do the job satisfactorily. Economy includes the initial cost, together with the cost of installation and the value of time saved in completing the project.

It is important to analyze the needs of the connection and to design accordingly, rather than arbitrarily specifying a particular fastener because it may be the most convenient to specify.

**Weigh These**—Factors to be considered in making a decision are:

1. Type of loading on the connections, such as static or dynamic.
2. Duration of the maximum load applied to the connections.
3. Time required to complete the connection.
4. Availability of the proper skilled labor.
5. Over-all cost of the project.

These factors will vary for each design and must be considered for every project. Some of the important considerations of the four types of connectors are indicated in the table.

**Looking Ahead**—Since the cost of a project will dictate its design, the future use of fasteners will be based on the competitive market. Standard bolts will continue to be used for minor connections and structures. Rivets will be the major shop-fabrication connection, with welding and the high strength bolts both making inroads in the shops. Riveting will hold its top place for some time to come.

Field connections will be made predominantly with high strength bolts because of their rapid installation and reduction of erection time. The Dardelet rivet-bolt will find acceptance in the same type of structures that use high strength bolts and in some specialized areas requiring a tight body-bound fit.

A constant search is under way to develop a better and more efficient fastener. It will embrace all the advantages of the rivet and high strength bolt combined with a saving of time and money. That goal may not be too far away.

# 4

## Structural Fasteners

Standard Bolt

Dardelet Rivet-Bolt

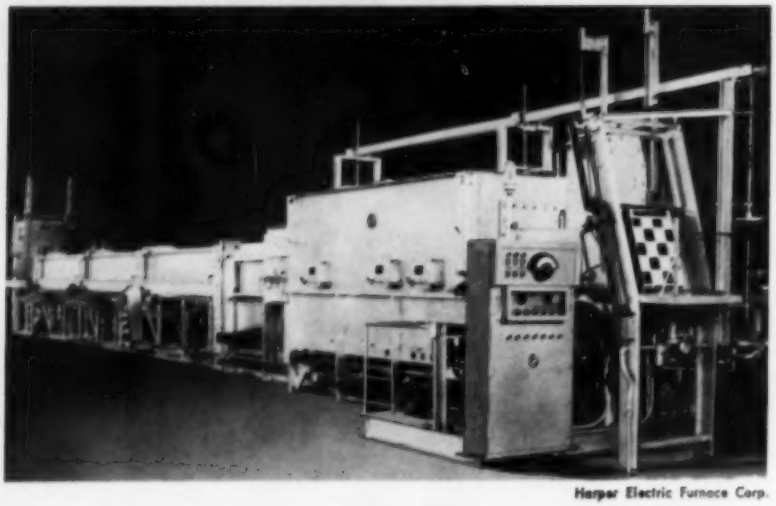
Hot-Driven Rivet

High-Strength Bolt

| | Standard Bolt | Dardelet Rivet-Bolt | Hot-Driven Rivet | High-Strength Bolt |
|---|---|---|---|---|
| ASTM Designation | A 307 | None | A 141 | A 325 |
| Allowable shear strength in design | 4420 lb | 6630 lb (min) | 6630 lb | 6630 lb |
| Tensile strength | 60,000 to 72,000 psi | 70,000 psi | 52,000 to 62,000 psi | 90,000 to 125,000 psi |
| Source of strength | Direct shear, bearing | Friction, direct shear, bearing | Friction, direct shear, bearing | Friction based on high clamping force |
| Ultimate carrying capacity | Low | Good | Good | Same as rivet |
| Fatigue: | | | | |
| Static | Poor | Good | Good | Good |
| Dynamic | Poor | Good | Fair | Good |
| Slippage | Some | Little | Little | Less than rivet |
| Vibration effect | Will loosen | Remains tight | Tends to loosen | Remains tight |
| Best application | Field connections | Field connections | Shop fabrication | Field connections |
| Type of connections | Girts and seated purlins | All connections | All connections | All connections |
| Specific uses | Small buildings, and structures | Buildings, crane structures | Buildings, bridges, towers | Buildings, bridges, towers |
| Men required to install (Minimum) | One | One | Four | Two |
| Availability of manpower | Readily available | Available | Questionable | Available |
| Time required to train men | Little | One-half day | Considerable | One-half day |
| Installation rate | Unknown | 175-300 per day with two-man crew | 175-300 per crew per day | 350-450 per crew per day |
| Method of Installation | Insert and tighten | Insert and apply measured torque | Heat, insert, and form head | Insert and apply measured torque |
| Equipment required | Hand wrench | Hand sledge, hand wrench | Heating forge, tongs, cone, bucking bar and gun | Impact and holding wrenches |
| Washers required | None | None | None | Two—carburized |
| Installation cost | Low | Equal to or less than rivets | About $0.75 per rivet | Equal to or less than rivets |
| Noise of installation | None | Slight | Loud | Some |
| Shop painting | Yes | Yes | Yes | Yes, for static direct loads only |
| Safety of installation | Slight hazard of falling bolts | Slight hazard of falling bolts | Fire, falling rivets and equipment | Slight hazard of falling bolts |
| Required inspection | 0 to 10 per cent | 10 per cent | 100 per cent | 10 per cent |
| Maintenance | Easily removed and re-used | Easily removed and re-used | Difficult to remove, must be discarded | Easily removed and re-used |

No. 3 in STEEL's Modern Brazing Series

By P. D. JOHNSON
Assistant Technical Director
Chemicals-Pigments-Metals Division
Glidden Co.
Hammond, Ind.



Harper Electric Furnace Corp.

All operations in this continuous, bright brazing furnace are timed and synchronized automatically. Atmosphere purging also is automatic

# New Kinks in Brazing

DEVELOPMENTS in brazing take two paths: Improved methods of joining the established metals and additional processes to match the physical and chemical requirements of the newer metals.

The normal furnace brazing procedure for joining tungsten carbide tips to AISI 1090 high-carbon steel is to sandblast a notched section of a steel shank and then thoroughly clean it. After fluxing, usually with a borax-fluoride type, copper foil is sandwiched between the shank and the carbide tip. More flux is applied, and the tip is tied in place with asbestos thread. The tip is brazed in a hydrogen atmosphere at 2050°F for about 10 minutes.

**Simpler Method** — The process can be simplified by using a copper-oxide brazing paste. A small amount of paste is placed on the shank and the carbide tip positioned. The assembly is permitted to dry about 1½-hours and then furnace brazed as before.

In a series of tests, the average break load using the conventional method was 19,000 psi. In about half the tests where paste was substituted for copper shims, the steel shank bent without the tip breaking. Average break load by this method was 31,800 psi.

**Eliminating Flux**—When copper shims are used as the brazing metal, flux may be eliminated by dipping the parts in a nickel-nitrate solution. Heat decomposes nickel nitrate to nickel oxide which in theory reacts with the carbon in the steel shank to form a nickel surface and provides for uniform spreading of copper.

Copper oxide functions in a similar manner ($Cu_2O + Fe_3C = 2Cu + CO + 3Fe$). Minute particles of copper are deposited over the entire surface, and bonding of the carbide tip to the steel shank occurs at brazing temperatures.

More refractory type metals, such as chromium, titanium and zirconium carbides, are being used in carbide tip formulations. Brazing of these metals is complicated by their susceptibility to oxidation.

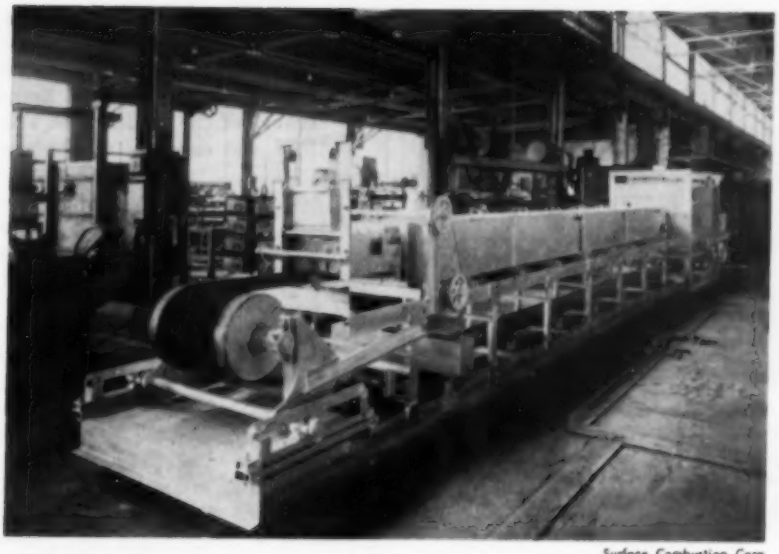
**Technique** — Refractory alloys, such as those containing chromium and manganese, are frequently furnace brazed using fluxes of the fluoride type. It is possible to eliminate fluxes with the following equipment and procedure:

**Furnace Design**—A batch-type or muffle furnace normally is used, but requires close attention to detail. Continuous furnace operations are simple, but necessitate careful construction principles. Best results are obtained with a mesh belt conveyor and an elevated heat zone which maintains proper atmospheric conditions. In all cases, the shrouding metal of the furnace must be intact to eliminate all "breathing" of air from the atmosphere.

**Atmospheres**—Hydrogen or dissociated ammonia is recommended. Dry pure nitrogen has been used successfully with a metallic copper powder paste in laboratory experiments. Dew points should be −65°F or even approaching −100°F to prevent chromium oxide or manganese oxide from forming on the surface of parts to be brazed.

**Brazing Metal** — Copper wire, copper oxide or metallic copper powder pastes can be used. Low-refractory - type copper alloys should also perform satisfactorily.

**Procedure**—For batch-type furnace: 1. Apply filler metal to part and place in preheat zone of furnace. 2. Purge furnace thoroughly with reducing gas. Some of the more successful in the trade purge with 20 times the furnace atmosphere capacity to assure complete displacement of air. 3. Push part into heat zone maintained at temperatures between 1900 and 1950° F. Allow 10 to 30 minutes for this step to insure removal of surface oxide film. The time cycle depends on the size of the part, dew point of atmosphere and extent of oxide coating. 4. Raise furnace temperature to the range of 1990 to 2050° F and allow 10 to 30 minutes to



Surface Combustion Corp.

**Mesh belt conveyor furnaces are high-production, closely controlled units. Silicon carbide muffles allow temperatures to 2100°F**

effect braze. Best results are obtained usually in the temperature range just above the melting point of copper—1990 to 2000°F. 5. Return part to preheat zone and thoroughly cool in reducing gas before removing from furnace. This may take up to 90 minutes. The minimum necessary time must be determined by experiment.

For continuous furnaces the procedure is similar to normal practices used in brazing common steel. Good results (not so certain as with the batch-type furnace) depend on furnace design and close control of dew points.

**Copper Paste** — Metallic copper powder and copper oxides have been used extensively as substitutes for copper wire or slugs in furnace brazing common steels. A typical example involves the multiple brazing of a refrigerator condenser assembly. The condenser is dipped in a light grade oil and then dusted with finely divided copper powder. It is furnace brazed by normal procedures.

The technique has been improved by using a copper-oxide brazing paste of paint consistency. The paste is usually sprayed on the part which is immediately furnace brazed in controlled endothermic atmospheres.

**Stainless** — A metallic - copper powder paste has been developed which is suitable for common and stainless steel brazing and is compatible with all types of furnace brazing atmospheres. Experiments indicate that this product also may be adaptable to induction brazing.

Bridging of large gaps (those in excess of 0.002 to 0.003-in.) is a problem frequently met in copper brazing. Pastes have always been inferior to copper wire in this use because the finely divided particles suspended in a vehicle result in perceptible spreading of the braze. High-density, metallic-copper powder paste in a new type vehicle affords bridging qualities not previously obtainable.

**New Pastes** — Encouraging results have been obtained with a paste similar to the one just described except that 60-40 brass powder was substituted for metallic copper. Because zinc is volatile, experiments have been limited to induction brazing of common and high silicon steels, such as Meehanite.

Another copper-oxide brazing paste is especially adaptable to silk-screening procedures. The paste is extruded through a silk screen onto precise areas of a part to be brazed. All other areas of the screen are blanked out. This paste has nondrying qualities and will not flake off prior to furnace brazing.

**Mild Steels**—A paste containing 90-per-cent copper, 10-per-cent tin is being used for furnace brazing common steels. Since the paste has a wide solidus-liquidus range —155 to 1850°F—roller hearth furnaces and temperatures of about 1900°F are preferred.

Extended furnace element life and minimized distortion of brazed parts result from operating at about 150°F below normal copper brazing temperatures. Strength of joints is about 30,000 psi. Slow furnace cooling tends to form the brittle, delta-phase, intermetallic compound $Cu_{31}Sn_8$, rendering the paste unsuitable for some uses.

**Copper Alloys** — Copper-phosphorus (92-8) has found limited use as a brazing media of copper and copper alloys, especially by torch methods. This alloy would be used more extensively if it could be easily shaped to the contour of the braze areas.

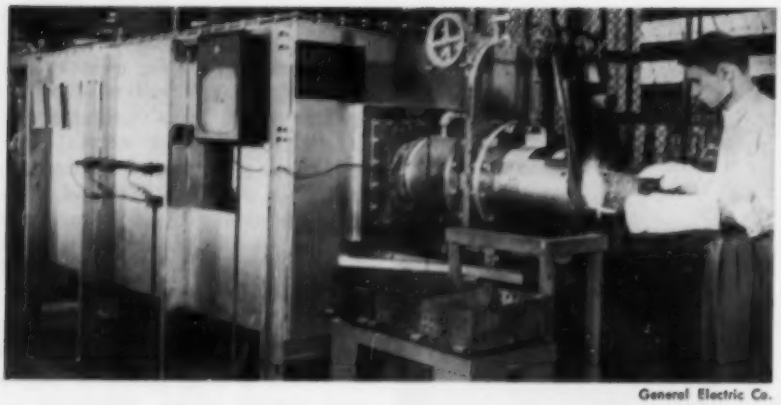
One answer has been a paste of this composition which is suitable for torch and induction brazing. The product contains a new flux which permits operating temperatures approaching the liquidus range of phos-copper-silver brazing alloys. Similar formulations contain various phos - copper - silver combinations.

Excellent laboratory results have been obtained with silver alloy pastes in torch and induction brazing. All these products have the advantage of incorporating just the right amounts of uniformly distributed flux.

**Application** — Greater use of brazing pastes will result from applicator design improvements. Pressure-type applicators are being used which apply paste without requiring agitation to maintain paste suspension.

Brazing paste is provided in polyethylene bags contained in metal pails. The bag and contents are transferred to the tank, and paste is extruded to the working areas with a gun. Improvements in gun design have virtually eliminated plugging, which accounted for considerable down time.

**Unsatisfactory**—Industrial practice shows that in many instances, as with stainless steels, brazing with fluxes or reducing atmospheres will not yield completely satisfactory results. When brazing stainless with fluxes, removal of fluxing compounds is difficult. The comparative viscosity of fluxes saturated with metal oxides may inhibit the penetration of the filler metal into joints with small clear-



General Electric Co.

This horizontal tubular retort is manually charged and discharged. An Inconel retort runs through the heating chamber and fastens to the entrance vestibule and the cooling chamber. There is a purging vestibule at each end. Trays of parts are pushed along with a long rod through a slot in the bottom of the furnace

ances, producing joints of poor uniformity and strength.

In a reducing atmosphere at a practical brazing temperature, stainless is subject to heavy oxidation if the atmosphere contains even the smallest amount of water vapor.

**Lithium**—Self-fluxing alloys with constituents capable of reducing base metal oxides are needed. Lithium seems to be the most suitable deoxidizing agent for such alloys. Wettability tests performed with 1 per cent lithium, 99 per cent silver alloy on low-carbon steel, drill rod and stainless steel have confirmed this.

Small additions of lithium not only reduce the oxides on the surfaces of these steels, but also lower the wetting (contact) angle of molten silver, promoting wettability and fluidity.

Lithium - bearing silver alloys and lithium-bearing copper alloys should prove useful for brazing plain carbon steels, as well as stainless steel, without flux or reducing atmospheres.

**Future Look**—What will we look for in new brazing alloys and fluxes?

Ductility which matches that of the parent metal is an important objective. After bonding has been effected, a gradation of alloys results through the interfacial area. The filler metal is often completely altered. It is for this reason that phos-copper cannot be used to join steel, since phosphorus will form brittle iron phosphide on the crystal lattices.

Generally, an alloy which has ductility should consist predominantly of various phases of solid solutions and aggregate insolubles, with a minimum amount of metallic compounds.

**Fluidity** — As a brazing alloy property, fluidity is variable, depending on the joint requirements involved. Generally, pure metals have higher viscosities and surface tensions than their respective alloys. If a part is assembled of closely fitting joints and capillary pull is depended on to carry the brazing media to the remotest areas, then great fluidity is essential. Rather loose fits and filleting call for a brazing media with sluggish characteristics.

Fluidity, as in the case of ductility, is influenced to some extent by the character of the parent metal alloy and may be altered perceptibly during brazing by diffusion and interalloying.

**Oxidation** — The degree of susceptibility to oxidation of a joining metal accounts for the extensive use of copper as a brazing filler metal. Fortunately, alloying frequently diminishes the oxidation tendencies of metals (compare the decomposition of zinc and high zinc-silver alloy at elevated temperatures). Brazing metals which are not readily oxidized do not impose rigid furnace atmosphere requirements and minimize flux usage in torch and induction brazing.

Filler metals should exert low vapor pressures at brazing temperatures. The use of 60-40 brass in furnace brazing of steel is limited because of the tendency of zinc to distill and damage furnace elements.

This consideration is most important in furnace brazing where the filler metal and parent metals are at elevated temperatures for an appreciable time. Joint characteristics will vary, depending on how much distillation has taken place.

**Direction**—Development of new brazing fluxes should be keyed to a particular type of joining method and filler metal. In furnace brazing, the flux ordinarily should melt at a temperature just below the flow point of the filler metal, provided both the filler and parent metals are not subject to oxidation or volatilization at low temperatures. If this is true, lower melting point fluxes are necessary to assure any degree of success.

With more rapid heating, as in induction brazing, a melting point which closely approximates that of the brazing metal normally can be tolerated. Even by this method, large parts require greater time for reaching brazing temperatures and correspondingly lower melting point fluxes.

**Activation** — Flux activation should occur near the melting point of the joining media, so that a minimum amount of attack on the parent metal occurs. If the parent metal is substantially altered by dissolving actions of a flux, embrittlement and porosity might be some of the undesirable consequences.

The ideal flux must have just enough activation to dissolve metal oxides and foreign materials adhering to the surface of the parent metal to permit complete wetting by the joining metal.

A minimum amount of flux activation is necessary to prevent substantial changes in flux composition which might lead to solidification within a joint interface area. Flux should be easy to remove if it is the least bit corrosive, or if plating follows.

Somewhat more obvious considerations in the search for new brazing alloys and fluxes are cost factors and ease of production.

Welsbach High Pressure Service Gas Valve with Revere Arsenical Bronze Stem.

# REVERE

## Deep-Drilling Brass Rod

### Increases Tool Life over 200% for Welsbach

### Why not try it yourself?

In the manufacture of valves the Kitson Division of The Welsbach Corporation, Philadelphia, Pa., has to deep-drill brass rod. Originally the rod was free-machining brass. However, when Revere discovered the extent of the drilling it was suggested that our Mixture 252, Deep-Drilling Brass, would be preferable. This was tried, and the machine shop foreman reported that tool life was increased over 200%. In one item it is possible to bore with a single operation, against the former practice of withdrawing the drill three times in order to clear the chips. Revere's Deep-Drilling brass produces very small, easily cleared chips.

Another item is a high pressure gas valve, with a cast body and brass rod stem. The rod was changed to arsenical bronze, which costs a bit more, but it ended flaking and galling between stem and seat, and materially reduced rejects. Still another instance of Revere service concerns a hot water heater relief valve. The original model was cut out of bar stock. We suggested a high leaded brass tube, hexagon outside, round inside. This greatly reduces machining, has a better surface, and a better seat. Costs more by the pound, but saves more by the piece.

Revere salesmen and Technical Advisors are always glad to collaborate in seeking ways to save money and improve products. Perhaps we can help you!

**REVERE**

**COPPER AND BRASS INCORPORATED**

*Founded by Paul Revere in 1801*

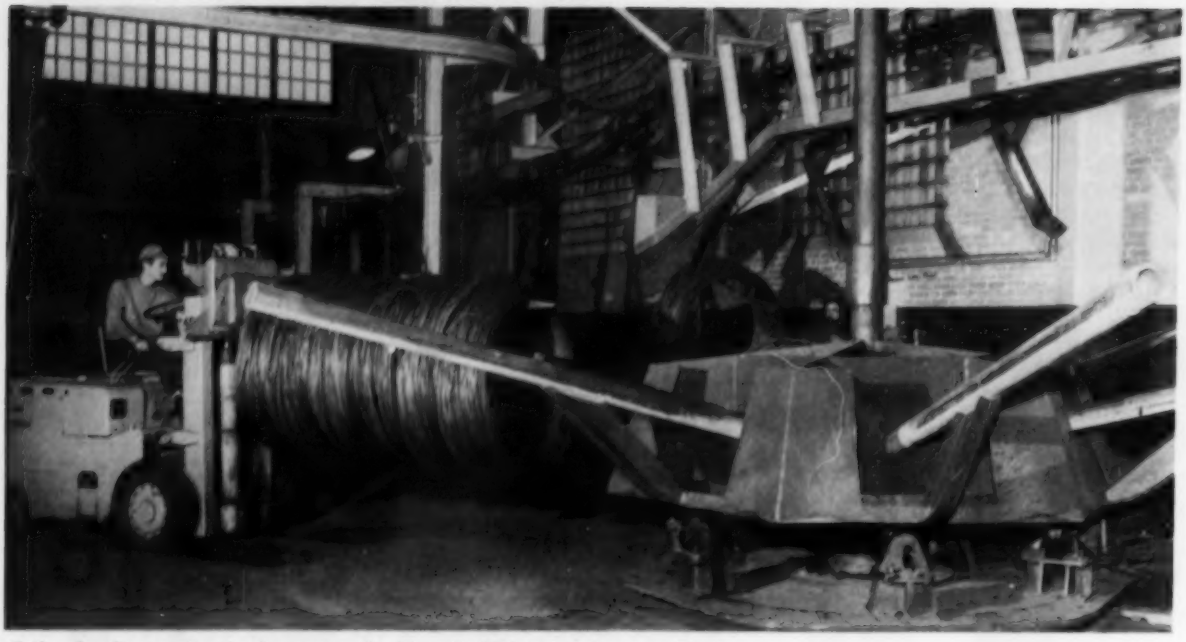
230 Park Avenue, New York 17, N. Y.

*Mills: Baltimore, Md.; Brooklyn, N. Y.; Chicago, Clinton and Joliet, Ill.; Detroit, Mich.; Los Angeles and Riverside, Calif.; New Bedford, Mass.; Newport, Ark.; Rome, N. Y. Sales Offices in Principal Cities, Distributors Everywhere*

Welsbach Temperature-Pressure Relief Valve.

Welsbach Emergency Gas Shut-Off Valve, automatic.

Pressure Relief Valve for water heaters.



Coil unloading station in the new rod mill at Bethlehem's Johnstown Plant

# Rolls and Rod Mills

"AT JOHNSTOWN you're cooling coils with forced air. At Atlas Steel we cool rod coils with water. What's the advantage? Less scale? Less pickling time?"

The questioner was echoing the tone of the AISE meeting in Baltimore Apr. 30-May 2. Over 900 operating people turned up to check on experience with new mills. The accent was heavy on rolling, with rod and bar mills tops on the agenda.

**Reason**—Economy of the modern wire-drawing shop and end use of wire products have dictated tighter requirements for rods such as heavier coil weights, control of section, freedom from surface defects such as roll scale and decarburization, and uniformity of mechanical and metallurgical properties.

"In designing the Johnstown mill," said J. C. Seibert, superintendent, Rod & Wire Division, Johnstown Plant, Bethlehem Steel Co., "every attempt was made to incorporate these requirements into the design of the mill."

**Compromise**—The mill, in operation only since December, is a compromise between a continuous and a looping mill. The continuous 9-stand roughing mill is followed by a 6-stand intermediate train ending in two 180-degree repeater stands. These feed into an 8-stand finishing mill.

Rods 7/16 to ¾-in. are coiled directly after the second repeater. Smaller rod goes from the second repeater through two to eight finishing stands (depending on rod size).

**Air Cooling**—What Mr. Seibert said to prompt the question from the floor was: "The laying reels are fully enclosed. Each of the six is provided with a separate fan which blows 7500 cfm of air on the 600 lb coil, with the draft continuing for a predetermined interval after all rings are laid. The four pouring reels are also enclosed and during the pouring operation 12,500 cfm of air is blown into each reel."

The effect, he pointed out later, is to drive the temperature of the coils as much as 300°F below what would be obtained with water cooling in the same period. Secondary scaling is largely prevented, and the gains show up in reduced acid consumption in pickling.

**J&L Mill** — H. I. Smith, assistant superintendent, rolling mills, Jones & Laughlin, Pittsburgh, described some of the unusual features of J&L's 10-in. bar mill, first operated in January, 1953. The 16-stand continuous repeater mill is designed to produce both rounds and shapes and deliver them as coils or straight lengths.

With smaller shapes, lengths rolled from one billet exceed the capacity of a single cooling bed by as much as 500 per cent. A switching mechanism was needed to distribute cut lengths to alternate beds.

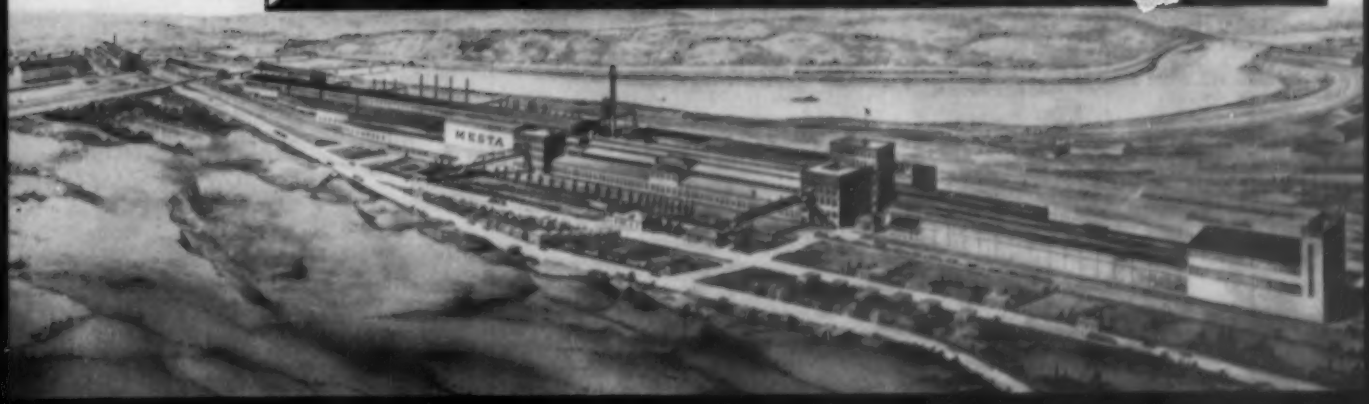
**Switch**—Several were tried, but the one that turned the trick was suggested by the roller (who profited by a large award through the suggestion system). It consists of two box funnels, one above the other, mounted 16 ft downstream from the rotary shears.

As a bar slides through the lower box and travels 50 ft, it contacts a roll which actuates a control circuit. The funnel moves sideways and up and the top funnel drops down to receive the next

DESIGNERS
and BUILDERS
of Complete
STEEL PLANTS

MESTA

THERE IS NONE BETTER




MESTA MACHINE COMPANY
PITTSBURGH, PENNSYLVANIA

bar. The cycle reverses for the following bar.

Adding to the versatility of the mill is provision for retracting stands 9, 10, 12 and 13, and shifting the position of the repeaters so that it is possible to use from 4 to 8 stands after the roughing mill.

**Phoenix Mill** — "It was logical that the Phoenix Mfg. Co., Joliet, Ill., (after rolling special sections on hand bar mills for 73 years) should branch out into construction of a large modern bar mill," reported Hugh H. Campbell, manager of manufacturing of Phoenix's Steel Division. Logic dictated a crosscountry mill of great flexibility.

The 6-stand, 12-in. mill is equipped for rerolling railroad axles as well as billets into flats, angles, reinforcing bars, rounds and special sections. Bars are transferred from stand to stand by reversing tables for heavy sections and repeaters for single or double strand operation on light sections.

Instead of the conventional skew rollers, bars are moved laterally on reversing tables by a sweep arm which lines up the bar for entry into the next stand. Mr. Campbell listed two advantages for this arrangement: 1. The bar is under better control. 2. Maintenance cost is lower than for skew type tables.

**Spindles**—How U. S. Steel Corp. handles spindle maintenance at Gary was described by Russell H. Davis, maintenance metallurgist, and I. D. Pottorf, general supervisor, maintenance development, Gary Works.

They listed wear, fatigue, impact (including backlash), torsion and faulty castings as primary causes of spindle failure. Wear on universal type spindle jaws is compensated by building up the worn area with a medium carbon steel rod, followed by machining.

Wobbler type pods are hard faced as part of the manufacturing procedure. When worn, the remaining facing is stripped. Then the pod is built up with medium carbon steel rod and again hard faced with manganese steel.

**Salvage**—Broken spindles have been successfully salvaged when not badly bent by Thermit welding. Spindle and coupling shaft are faced in a lathe and aligned by a 2-in. centered pin. Straps are welded around the circumference to maintain alignment during Thermit welding. The straps are later burned off.

They point out that: "It is advantageous to provide a weak link in all mill drives. It should be a part that can be replaced with a minimum of down time, and one that can be readily manufactured.

"In many cases a coupling box or cast-to-size breaking spindle satisfies the two conditions. If some part in the drive must be broken due to overloads, it is much more economical to replace a coupling box than a pinion or spindle," said Mr. Pottorf.

### Three Rules To Cut Banding Troubles

Banding on work rolls is a serious problem in 4-high hot strip mills. Caused by adhesion of patches of scale on the roll surface, it occurs primarily on the first two finishing stands. These scale patches make an impression on the strip, creating an uneven gage. Here are the rules Charles E. Peterson, chief metallurgist, Mackintosh-Hemphill Division, E. W. Bliss Co., gave the AISE to minimize banding:

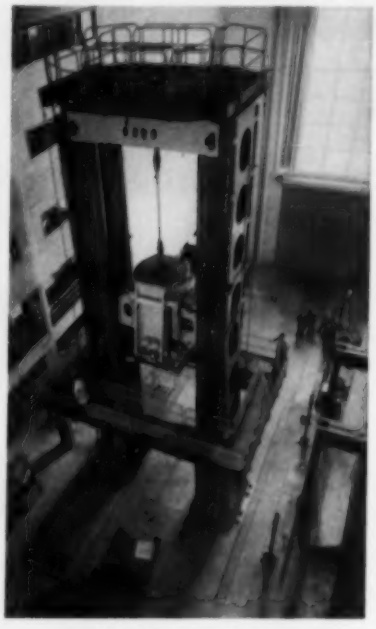
**1. Wash off, break loose, and in any other manner possible remove all scale from the strip before it goes into the finishing stands**

**2. Select a roll material which gives the best combination of freedom from graphite with high hardness**

**3. Keep work rolls as cold as possible with plenty of water applied with pressure**

# Tests Strands

**THE ROOF of a TWA hangar at the Philadelphia airport will be supported by steel strands instead of conventional ceiling beams and trusses. Strand assemblies will be checked on the universal testing machine at Lehigh University.**



HANGAR STRUTS
*. . . are tested to check design*

**Specimens** — The lean-to-style roof will be supported by 20 sections of galvanized steel bridge strands, 2 9/16-in. in diameter by 150 ft long. Strands will be supported in pairs by ten steel towers (28 ft high) set near the outboard edge of the roof. Strands pass over a saddle on the top of each tower.

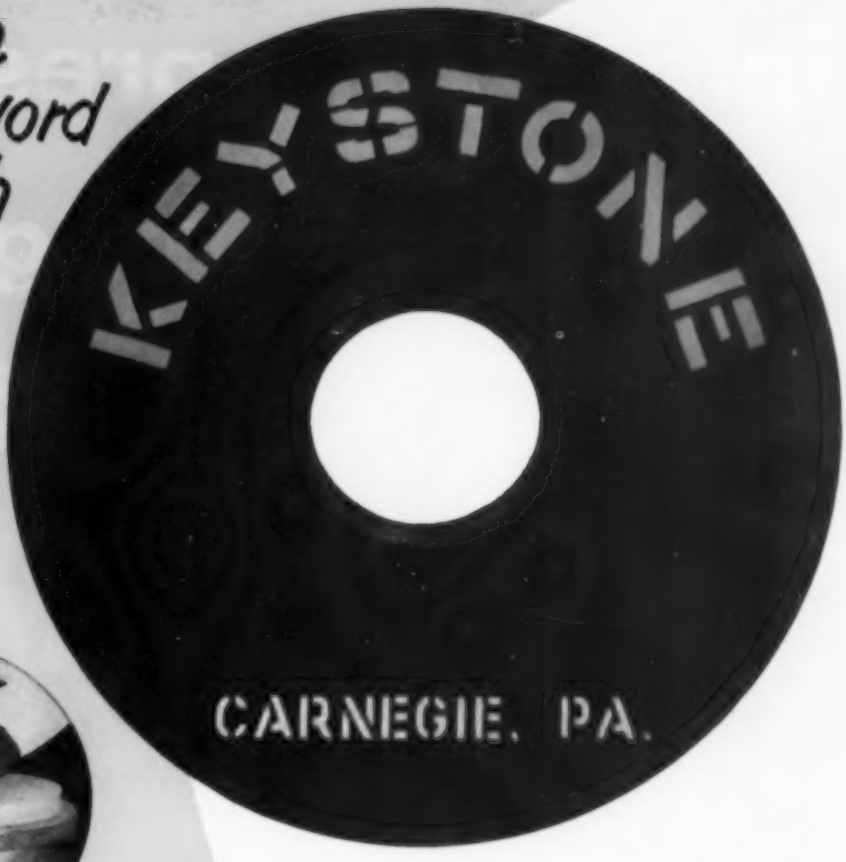
Each strand will be attached to an anchor rod, 4 in. in diameter and ranging from 11 to 32 ft in length. Anchor rods are made from heat treated alloy steel which is tested in an extensometer. Rods will take a 980,000-lb pull.

**Test**—The Lehigh tester exerted 1,552,000 lb before the anchor rods failed. A specimen assembly of the strand, socket and anchor rod was tested at 784,000 lb.

In the construction, one end of the rod, together with a washer and nut, is embedded in a concrete anchor. The hangar is being constructed by the Lehigh Structural Steel Co.

# Quality and Service...

## the watchword with



Here we see a routine check given every Keystone wheel, to assure exact conformity to specifications.

A master card is prepared, listing the exact specifications required.

**Quality** ingredients, plus experience and *quality control* at every step of our manufacturing process, results in as nearly perfect a product as possible.

**Service** to our customers is uppermost in our minds. We would like to include you in our list of satisfied customers. A card or call to KEYSTONE, Carnegie, Penna., will bring a sales representative.

**keystone**
**abrasive wheel co.**
CARNEGIE, PENNSYLVANIA

# Farquhar... the first triple-acting press with electric magnetic controls...

EVERY ADJUSTMENT of speed, timing and pressure is made by the operator on this Control Panel without leaving his operating station. It is no longer necessary for him to climb to the top of the press for this purpose.

## ...the only press that can do so many things so well

THIS hydraulic press revolutionizes the high speed production of draw-formed parts. We believe that it has rendered obsolete every double-acting and triple-acting press now in service. These are challenging statements... *but read the facts.*

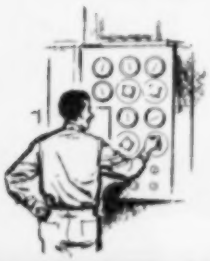
**A. B. Farquhar Division, The Oliver Corporation**
**Press Department, York 53, Pennsylvania**

OLIVER

*Farquhar* PRESSES

DRAWING • FORMING • FORGING • STRAIGHTENING • BENDING

- **Unlimited speed changes** now possible at any point in the cycle. This means, for example, that the ram can approach the draw at maximum speed, slow down as it enters the draw, change speed in the middle of the draw, strip slowly and return to up position at maximum speed.
- **Draw-forming of difficult materials** is thereby greatly simplified and improved. The exact speed can be selected which is best suited to the characteristics of the material at any point in the stroke.
- **Expensive dies** can be given added protection by "gentle" treatment at point of contact and withdrawal.
- **Cycle time is greatly reduced,** because maximum speeds can be attained at every desired point in the cycle.



- **No expensive cams** with time-consuming adjustments are needed to obtain these results. All speed changes are made by dial settings on the control panel.

- **4-point adjustment of blank holder pressure** is made by operator without leaving operating station, an important device in the draw-forming of eccentric shapes. This has been a feature of Farquhar Double-Acting Presses in the past. It is an important feature of the new Farquhar Double and Triple-Acting Presses, too.
- **Best of all,** with these additional advantages, the Farquhar Double and Triple-Acting Presses are competitively priced!
- **For a more complete description** of these new Farquhar Presses with electric magnetic controls, write for Bulletin A-200. Please use your company stationery. A. B. Farquhar Division, The Oliver Corporation.

Speeds are pre-set by these radio-type dials which can be located within the main control panel or in a remote position.

FORCING • ASSEMBLING • EXTRUDING • AND OTHER OPERATIONS

This x-ray equipment by General Electric quickly tells the chemical analysis of metals. Using what is called a diffraction technique, metallurgists can predict the effects of heat, stress and fatigue on metals tested

# Tests That Save

**The nondestructive test ties in with the automatic production line. The manufacturer finds it's profitable to know (not to guess) how good his product is**

By A. L. PACE
X-ray Department
General Electric Co.
Milwaukee

NONDESTRUCTIVE tests are becoming more popular as new ways are found to adapt them to the automated production line. To help you decide whether they fit your operation, here are some important points to consider.

**Benefits**—These points will give you a good idea of what ultrasonics, magnetism, x-rays, black light or radiographics can do:

1. Save labor by eliminating defective raw materials.
2. Tell you when to use less material.
3. Tell you when and what to correct.
4. Examine subsurface structure without destroying the part.
5. Sort the good from the bad.
6. Permit serviceability study.
7. Help in the search for new materials.

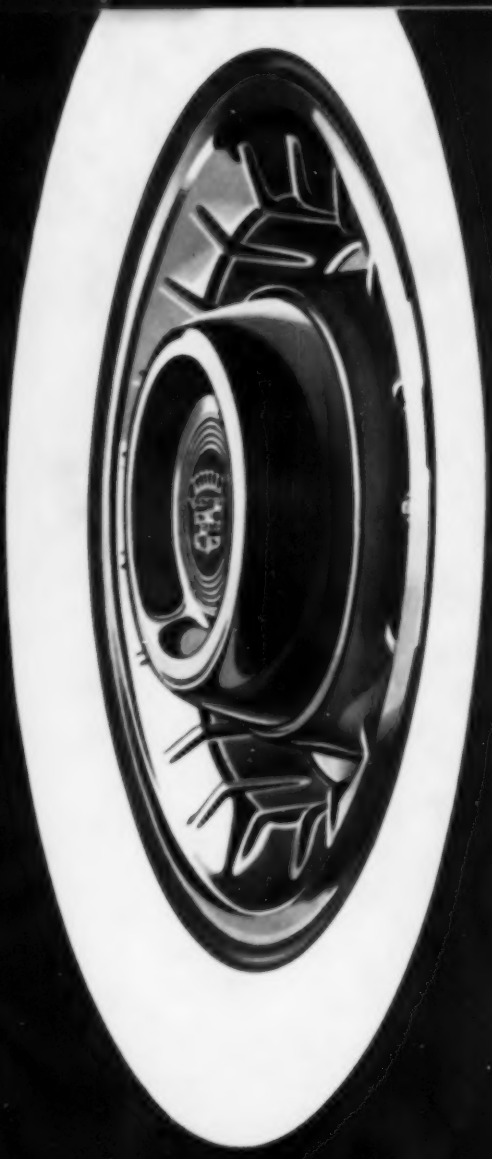
**Limitations**—You must interpret results and correlate physical properties and the performance of the material if you want to apply these tests effectively. You shouldn't consider using nondestructive testing when:

1. The material isn't suitable (doesn't respond, is too thick, etc.).
2. The tests don't help you select the material you want.
3. The defects you're looking for can't be detected by the equipment.
4. The testing is too expensive.

How can you tell whether nondestructive tests are profitable? Add up these costs: Machine scrap and tool replacements caused by faulty raw material; inspection time to sort scrap; cost of replacing defective parts sent to your customers. Be sure to consider what fewer rejects can do for the reputation of your product.

**Energy** — Four basic kinds of energy are used to detect and analyze materials: Light, magnetism, sound, x-ray and gamma rays.

Light supplied by ultraviolet



## Mr. Motorist:

why are the wheel covers on your car made of

# stainless steel?

Because nothing less than true stainless steel gives you the beauty that smiles at exposure . . . the strength that shrugs off years of highway hazards! Down where the going is roughest, stainless wheel covers stay bright and unblemished despite destructive road chemicals, flying grit, cinders and gravel—*proving the point* that for every automotive application where timeproof, carefree brilliance is desired, stainless steel is the metal of choice. Look for it, everywhere!

**SUPERIOR** STAINLESS STRIP STEEL

**Superior Steel**
CORPORATION
CARNEGIE, PENNSYLVANIA

# He's within an inch of his life...

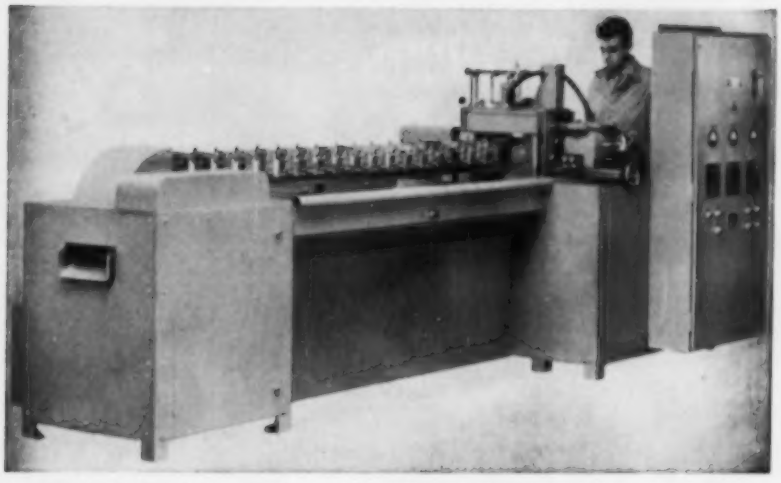
## *but* U. S. Matchless Steam Hose *kills all the risk*

Scalding steam—a roaring, raging demon hot enough to cause severe injury or death on contact—is tamed and controlled by U. S. Matchless® Steam Hose. After long, safe service (even with steam pressures up to 200 pounds) the wall structure, instead of bursting, allows a trickle of steam to merely *leak* through—acting as a safety valve and giving notice that it's finally time for a replacement. That's why plant safety councils everywhere firmly approve of the U. S. Matchless.

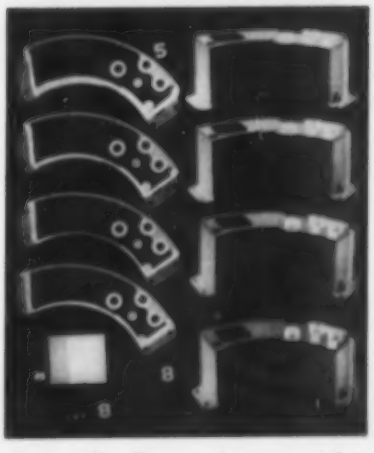
This great hose delivers long service. Despite its great strength, it is as flexible and easy to handle as cotton hose. It is used for steam lines in railroad yards and in roundhouses, steam pile drivers, steam supply lines from docks to oil barges, and steam lines in manufacturing plants. Other important uses are fire protection in oil refineries, thawing out tank cars, steaming out drums in chemical, soap and paper plants and paper mill black liquor recovery systems. U. S. Matchless Steam Hose is obtainable through any of the 28 "U. S." District Sales Offices, or write us at Rockefeller Center, New York 20, N. Y.

Mechanical Goods Division

# United States Rubber



Magnaflux inspection can be rapid. This unit inspects turbine blades at a 2400-an-hour clip



X-ray will tell you when material is too thick. You can easily find out which castings (top) are thicker just as you can spot tool-breaker tungsten inclusions (bottom) in the titanium forging

lamps is used with dyes, penetrants and fluorescent powders that show up cracks, holes and similar surface defects. The low cost of this type inspection, especially first cost, is an incentive to its use in smaller plants, especially for small runs.

Magnetic inspection uses iron powder in a magnetic field. The powders can be colored and are usually applied in a fluid. Flaws, inclusions, cracks and porosities show up clearly in the interrupted linear arrangement of the iron particles. Use is limited to ferrous parts where surface and near-surface imperfections are critical.

Ultrasonic testing is based on one of the oldest quality tests known. The blacksmith tested his product by listening to it ring. Railroad men still test car wheels with a hammer—if they're cracked they don't ring properly.

A high frequency sound generator is the modern equivalent of the hammer. The path of sound through many materials can be followed with a detector or monitor.

A small "loudspeaker" called a probe is fastened to the part being tested. Defects can be seen visually on the monitor.

X-rays are easy to produce and give clean, sharp images. Photography of parts with x-rays is called radiography. It accurately reveals internal soundness or unsoundness. It also provide historical proof for future reference.

You can use a fluorescent screen with x-rays to get a quick visual picture of what's inside. Be careful in selecting the job because a fluorescent screen is less sensitive than film.

**Predictions** — X-rays respond readily to the crystalline structure or arrangement of atoms. Data are available on interpreting photographs, and you may predict how metals will react to heat, stress and fatigue.

Chemical analysis with x-ray spectrography is widely accepted. It is quick and accurate although special equipment is required.

**Applications**—One manufacturer was using a small aluminum casting to make a camera shutter. Each finished part cost $5.57 and rejects were running about 30 to 40 per cent. He decided to use x-ray even though the test cost 28 cents for each casting. Net scrap savings were 85 per cent.

X-rays are useful in detecting metallurgical problems. A titanium forging gave one operator trouble. Tool costs were unreasonable because of tungsten inclusions which resulted in a rejected part and broke cutting tools as well. X-rays of rough forgings eliminated those with the objectionable tungsten deposits.

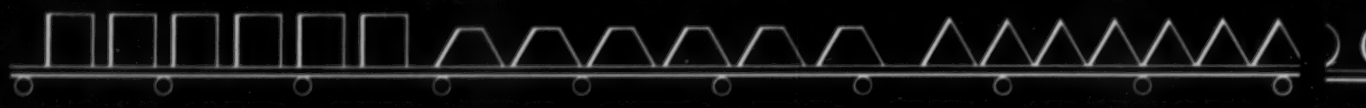
One new type is called an x-ray diffraction instrument. It does not depend on a conventional Geiger counter but on a high-speed, proportional counter and preamplifier that lasts 1000 times longer.

It's routine for this instrument to identify single crystals of an unknown organic or inorganic substance. One feature is the analysis and study of fibers, wires and the preferred orientation of crystals by the reflection method. The manufacturer makes the equipment in components so that a user can start with moderately priced equipment and add more expensive elements later.

# WHICH PRODUCTION PATTERN IS YOURS?

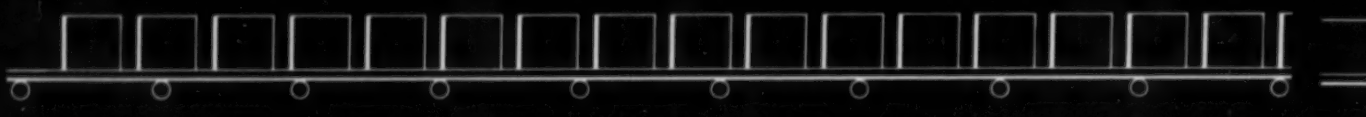
JOB LOTS—VARIETY OF SMALL PARTS

JOB LOTS—VARIETY OF LARGE PARTS



HIGH PRODUCTION—SAME SMALL PARTS

HIGH PRODUCTION—SAME LARGER PARTS



# NOW . . . 4 NEW G-E INDUCTION HEATERS MATCH

You get maximum induction heater performance at minimum investment cost when you choose one of General Electric's new electronic induction heater models. Each model is tailored to one of the basic production patterns illustrated above. This lets you buy only the induction heating features you need for your particular production pattern.

In any one of the four ratings—7½-, 15-, 25-, 40-kw—you can choose a model to match your production pattern:

**FOR HEATING SMALL AREAS** the built-in output transformer is recommended. This feature enables you to couple power at maximum efficiency into a wide variety of low-impedance inductor coils.

**FOR HEATING LARGER AREAS** the tapped tank coil is recommended. The tap-adjustment feature lets you couple the heater power into a wide variety of high-impedance inductor coils.

**FOR JOB-LOT PRODUCTION OF A WIDE VARIETY OF PARTS,** variable power adjustment is recommended. Grid control of thyratron tubes permits manual adjustment of power under load from 0 to 100 per cent.

**FOR HIGH-VOLUME PRODUCTION, IN WHICH YOU DO NOT HAVE RAPID CYCLING,** the variable power adjustment feature is not needed. In these applications, the heater is adjusted initially to heat a specific part. No further adjustment is necessary until you change to a different part.

Features in any of the four ratings can be combined in the following fashion:

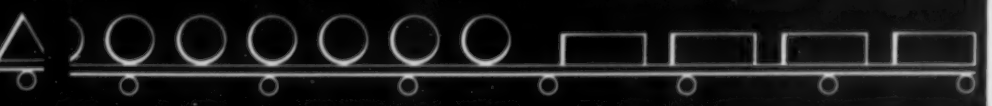
| Model | Thyratron | Output Transformer | Tapped Tank Coil |
|---|---|---|---|
| 4HM L1 | x | x | |
| 4HM L2 | | x | |
| 4HM L3 | x | | x |
| 4HM L4 | | | x |

Your nearby G-E Heating Specialist will help you choose the model best suited to your production pattern. You'll be paying only for those induction heater features you will use in your operation.

For specific bulletin information about these new induction heaters send in the coupon at the right.

GENERAL ELECTRIC

4HM L1



4HM L3

4HM L2

4HM L4

# ANY PRODUCTION PATTERN . . . ECONOMICALLY

***G.E. Gives You All These Features — and More!***

| DESIGN FEATURES | G.E. |
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| High KVA Oscillator | |
| Built-in Water-to-air Heat Exchanger | |
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| Dust-tight Cabinet Construction | |
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| Filament Voltage Regulation of ±3% | |
| Water Flow Switch to Protect Oscillator Tube | |
| Three Instruments on Control Panel | |

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**Section A722-4**
**General Electric Company**
**Schenectady 5, New York**

**Please send me a copy of your bulletin "New G-E Electronic Induction Heaters" GEA-6388.**

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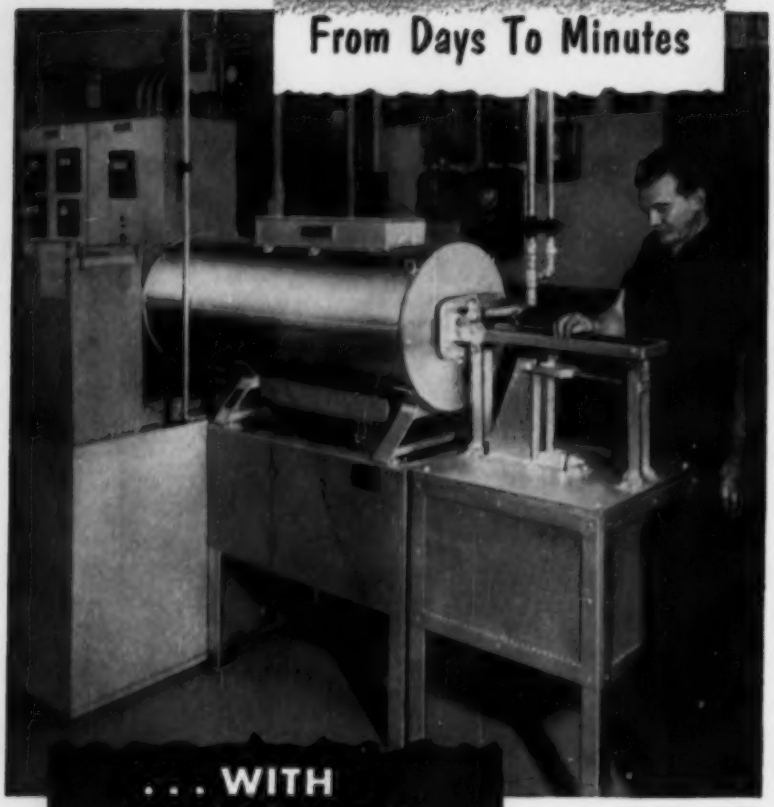
GENERAL ELECTRIC

Hardening Time Cut
From Days To Minutes



. . . WITH
HEVI DUTY
SHAKER HEARTH
FURNACE

Master Lock Company

SPEEDS PRODUCTION WITH THIS NEW FURNACE

Heat treating of an 80 pound batch of small springs required two days when hardening in charcoal filled containers. This process was not only slow but also costly due to a high percentage of rejects.

Now in a Hevi Duty Shaker Hearth Furnace, a similar batch is "bright" hardened in 75 minutes. Each spring receives uniform heat treatment without distortion thus cutting production costs. This furnace has been designed to solve your problem of heat treating small parts.

HEVI DUTY

*Learn more about this modern production tool and the way it can help you.*
WRITE FOR BULLETIN HD-850.

HEVI DUTY ELECTRIC COMPANY
MILWAUKEE 1, WISCONSIN
*Heat Treating Furnaces . . . Electric Exclusively*
*Dry Type Transformers* *Constant Current Regulators*


# Vertical Broach

**It loads, broaches and unloads 560 parts an hour. Five different parts can be handled**

AUTOMOTIVE lever arms are broached automatically on a five-station, four-at-a-time, pull-up machine made by Colonial Broach & Machine Co., Detroit. Punched holes, 7/8-in. in diameter, are finished to 1 5/64-in. at the rate of 560 an hour. The machine is rated at 15 tons and has a 66-in. stroke.

Four broaches are pulled through the lever arm holes simultaneously. Up to five different parts may be broached by mounting the proper face plates on each of the stations on the rotary indexing fixture. A hydraulic circuit automatically indexes the fixture; it is interlocked with the machine circuit for continuous operation, a feature that permits operation at 100-per-cent capacity.

LEVER ARMS
*. . . loaded and broached automatically*

**Positioning**—The rotary fixture has three indexing positions for broaching and three for broach return. This permits loading any of five different parts side by side while parts are being broached. The third position permits automatic unloading.

The lever arms in this application vary from 6 3/8 to 8 3/8-in. Broached holes are 1 1/32-in. deep.

## Let our experience help you

For more than forty years manufacturers in every industry have availed themselves of Bohn's technical skill and fabrication know-how. The benefits of Bohn's wide experience in extrusions, castings and forgings and other fabricated products are available to you. Let us quote on your specifications. Send us your blueprints today!

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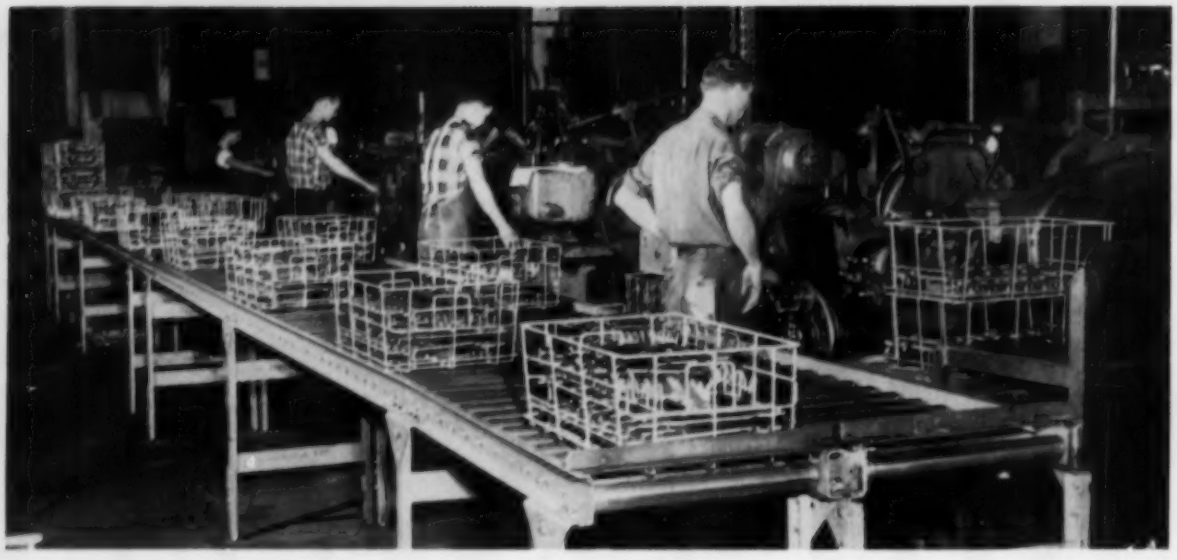


# Finding a Better Way

**Faced by rising costs and dwindling sales, Servel decided to change its way of doing things. Here's what happened in six months of concentrated effort**

A CARTOON in a vice president's office at Servel Inc., Evansville, Ind., shows two workmen: One is a prehistoric man lashing his hut together with rope; the other is a modern man using an arc welder to put a steel building together.

In a sense, the cartoon caricatures what has happened in Servel's Commercial Refrigeration Division since last November. Old ways of doing things have given way to the new. The refrigerator maker is rebuilding on a solid foundation, using such building blocks as improved plant layout, better methods, training and product design.

Substantial returns are showing up already: The division, faced with doing the impossible on a small budget, has slashed labor costs 40 per cent by using rebuilt machinery, conveyors and hoists.

**Men**—In casting its new play for profits, Servel operated on the principle that there's no substitute for talent. It had good engineers, loyal workmen. It added strength with a new vice president and general manager, John R. Morrill, and Al Wirick, a manufacturing manager with a wide and varied industrial engineering background.

Not satisfied, it started a widespread training program covering modern manufacturing methods to upgrade foremen and workmen. The program is more than paying for itself in improved morale and suggestions to improve efficiency still more.

**Beginning**—Even if it now seems obvious, it was hard to know where to start. Tote boxes and lift trucks were used to carry parts from one end of the shop to the other. There were no records of what each machine could do.

Methods engineers and foremen made an analysis of each operation. Based on these, rearrangements were begun on the production lines for individual parts. In general, management decided to stick to straight, in-line operation, since space wasn't at a premium.

"The main thing is to obtain adequate machinery to do the job.

*Prior to methods-time-measurement, assemblers had to get these parts from an overhead shelf. Now the assembler does his work faster and easier. He can sit instead of stand*

At the same time, there must never be too much machine for one operation," says Mr. Wirick. Let's see how the concept was applied to the green crankshaft line.

The smaller compressors use a single throw, cast iron crankshaft. Castings are purchased, then machined, heat treated and assembled. The first rearrangement was to put the equipment side by side from center drilling to heat treatment.

At this point, results of studies were used to grade each piece of machinery. If a machine couldn't keep up with the preceding operation, it was altered or replaced with one that could. In some cases, this was done by increasing spindle speeds and power. Carbide tools were used freely to prolong tool life, minimize shutdowns and maintenance. In another case, four drill and counterbore operations were combined into one by using a multiple spindle attachment on a belt-driven drill press. Air chucks have been added to speed loading and unloading in turning operations.

**Handling**—Many of the cost reductions came from minor improvements like placing parts next to an operator, and from the methods-time-measurement studies of an operator's motions.

Roller conveyors are arranged parallel to the production line. In most cases an operator can reach a basket of stock by simply turning around from his work position.

The rough castings on the larger

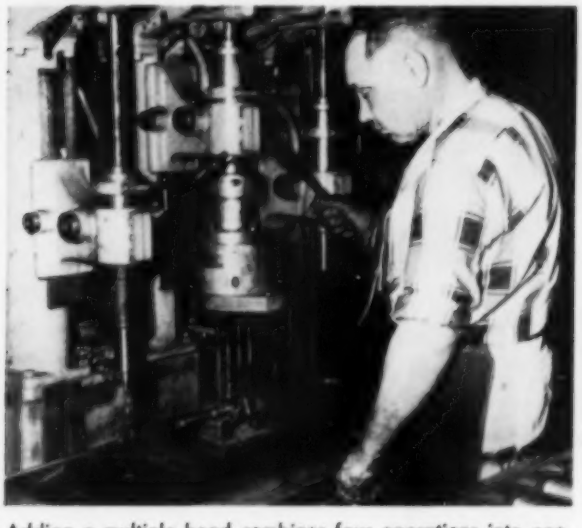
### Where Talent Counts

**Compressor valve covers must have a high surface finish. To get it, Servel made one of its few capital investments on this Blanchard.**

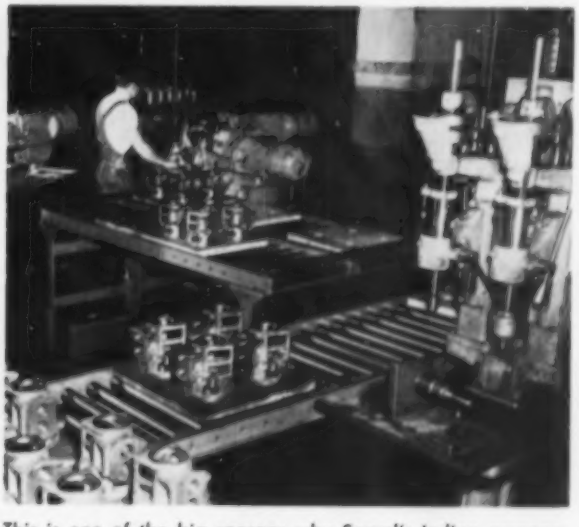
At first, production was unable to get the 5 microinch (rms) finish it wanted. An analysis showed that impure coolant was guilty. It looked like another capital investment (some estimates went to $8000) was needed.

Wiser heads got together and came up with this 8-section settling tank. The pump at the far end is the circulating device.

Result: 75 per cent fewer rejects. Saved: Another capital investment.



Adding a multiple head combines four operations into one. The part is a green, cast iron crankshaft for a small compressor. Note roller conveyor (lower right)



This is one of the big reasons why Servel's in-line arrangement is successful. The roller conveyors are inexpensive and conveniently located behind each operator

## GET EXTRA SUB-HEARTH

# SAFETY AND LONGER LIFE

## WITH KAISER PERICLASE D-S BRICK →

THIS superior brick has been *especially designed* to withstand sub-hearth conditions. Thus, it gives maximum protection against costly breakthroughs and provides longer sub-hearth life.

Steel men agree on the important properties for a sub-hearth brick. They are all found in Kaiser Periclase D-S Brick.

High MgO (more than 95%) is achieved through the use of pre-shrunk, accurately sized Periclase grains derived from sea-water magnesia. Absence of chrome eliminates the reduction of chromium oxide and damage to the refractory structure.

Low iron content minimizes refractory damage from alternate oxidation and reduction of iron oxide and other iron compounds. Absence of calcium oxide prevents damage caused by slaking during slow heat-ups or while furnace is idle.

With all its many advantages, Kaiser Periclase D-S Brick gives you the ultimate in sub-hearth safety and durability—*yet costs no more!*

Kaiser Chemicals Division, *Kaiser Aluminum & Chemical Sales, Inc. Regional Sales Offices: 1924 Broadway,* OAKLAND *12, Calif. . . . 3 Gateway Center,* PITTSBURGH, *Pa. . . . 518 Calumet Building, 5231 Hohman Ave., Hammond, Indiana* (CHICAGO).

## For the ultimate in steel furnace refractories . . .

**Kaiser PERICLASE Brick for the Steel Industry:**
**• Kaiser Periclase D-S Brick • Kaiser Periclase Chrome Brick • Kaiser Chrome Periclase Brick**
*Now available! A companion mortar for Kaiser D-S Brick. High purity periclase composition and maximum workability.*
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CHEMICALS K KAISER REFRACTORIES

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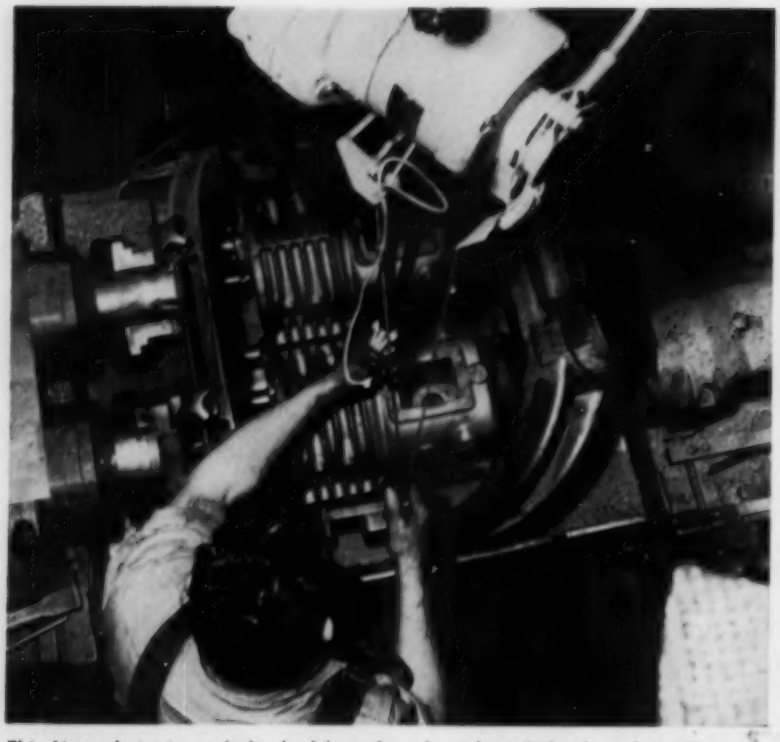

This ¼-ton hoist is symbolical of how Servel made a little do a lot. The castings weigh 80 lb, used to require two men to load and unload. The hoist reduced handling time almost 75 per cent

compressors weigh 80 lb. They used to be stacked in the center of the aisle on pallets, moved by lift trucks. Two operators loaded each machine by hand, which meant that one had to shut down his operation. A simple, ¼-ton hoist over each machine has cut loading time 75 per cent; roller conveyors replace the pallets. Quality and production are improved because operators can concentrate on running equipment.

**Finish**—One of the major expenses was for new degreasing and surface treatment equipment. The break-in period on a compressor has much to do with its peak capacity. The new Parker Lubrite equipment coats the cast iron surfaces with phosphate that acts as a minute sponge for break-in oil. Tests show that the small compressor gains 300 to 400 Btu from the better break-in.

The old system used a zinc-chromate primer prior to enameling. An iron phosphate coating, put on in the first stage of the wash operation after silver solder, eliminates the need for a prime coat.

**Take a Look**—The final assembly of the sealed units is done on a belt and roller conveyor. During the analysis of these operations, a foreman noticed that everyone had to bend over to do his job. Raising the belt 4 in. eliminated bending, improved job quality.

Without any investment other than moving costs, rearranging has saved 30 per cent of the labor on the final line. Pistons and crankshafts, for example, must be fitted selectively. They were stored in bins, one layer on another. Operators had to reach into the bin to select a part. Placing parts so each could be grasped on contact further improved efficiency.

Stators for electric motors used to be unloaded and passed over the conveyor for storage. Simply removing a leg of the conveyor permitted the pallet truck to roll underneath.

**Grasp**—Classes in methods-time-measurement point up the need for eliminating wasted movements. One of the early changes it sparked was the grasp-bin arrangement. For example, parts for the compressor valve plate used to be on a high shelf. The new arrangement (photo, page 132) scientifically reduces hand motions to a minimum.

In spite of its progress, Servel explains that it's just getting started. Statistical methods will be used in quality control. Meanwhile 100-per-cent testing continues.

The product has been redesigned. The horizontal style of compressor has been replaced by a vertical assembly. A wider variety of hermetically sealed units is being added. Tests are being conducted that will widen the range of units offered.

The new product, says the chief design engineer, has an improved valve design, motor overload protection mounted on the top dome, a higher power factor and a suction-cooled motor which is mounted on redesigned springs.

The cartoon in the vice president's office applies less to Servel every day.

## Meet Al Wirick

**Al Wirick is the manufacturing manager of Servel's Commercial Refrigeration Division. He has two loves: industry and people. They, and his wide experience, counted heavily in the reorganization which cut labor costs 40 per cent**

**THIS IS ONE OF FOURTEEN** specialized engineering groups at McKee. Modern, well-equipped quarters are completely air-conditioned. Additional facilities for our expanding organization will be provided in a new two-story building now under construction.

# McKee *has the Engineers* to design your plant

● In these days of competition for engineering talent, McKee can supply the services of a large, experienced organization that is well-qualified to design your new plant.

McKee designs and builds blast furnaces, steel plants, petroleum and chemical processing plants, ore preparation facilities and industrial plants. This wide diversification of activities and our fifty-year record of successful, world-wide operation are among the factors which attract top engineers to McKee. Our large staff grows steadily and we continue to welcome applications of qualified men in many fields.

For you, this adds up to an experienced organization capable of undertaking your new plant project promptly and efficiently regardless of size or location.

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*for the first time..*

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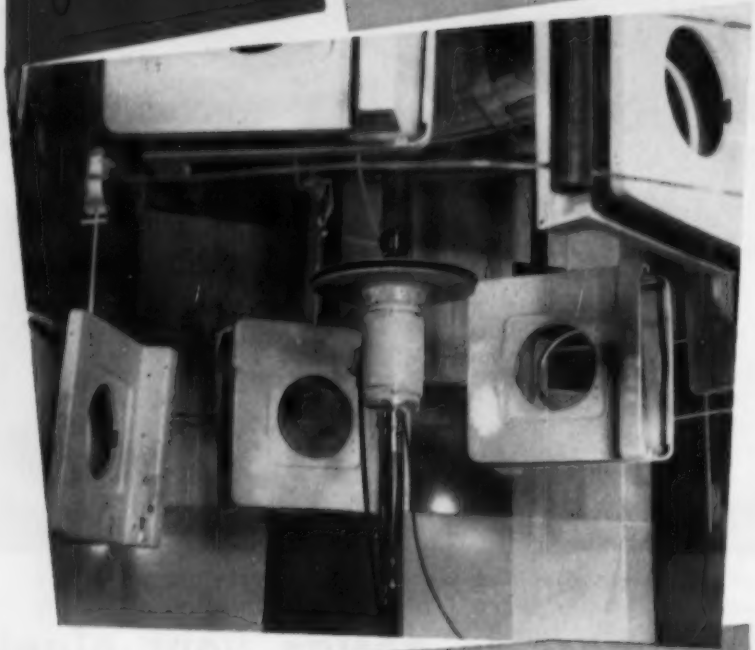
**Yes, even spectacularly—**
**with RANSBURG NO. 2 ELECTROSTATIC SPRAY PROCESS**



General Electric—an extensive user of Ransburg Electro-Spray for painting with synthetic enamels—is the first to use Ransburg No. 2 Process in the application of porcelain enamel.

GE—less than a year in electrostatic production—now is processing almost a million square feet of cover coat each month in the General Electric Home Laundry finishing department at Appliance Park.

**DRYER TOPS AND WASHER COVERS ARE BEING COATED ELECTROSTATICALLY WITH THESE SPECTACULAR RESULTS**

Quality of appearance and chip resistance are greatly improved with all colors: white, yellow, pink, turquoise, blue and brown.

About 97% of the atomized enamel is deposited on the washer and dryer parts.

Because of improved uniformity in coating thickness, weight of applied enamel was substantially reduced.

Because of lower application weight, the few rejected parts can be re-processed many times before being scrapped. This reduces the ultimate scrap rate by at least 95% of that previously expected.

Efficiency, measured by the amount of good ware, averages above 90%.

*Want your products tested?*

Ransburg has fully equipped laboratory facilities including reciprocating disks, helical conveyors, stationary disks, and the latest advancements in equipment for applying porcelain enamel with the No. 2 Electrostatic Spray Process. Manufacturers are invited to send sample products to our Indianapolis laboratories for tests and demonstrations to prove for you the advantages and benefits of electrostatic spray application of porcelain enamels.

Ransburg ELECTRO-COATING CORP.
Indianapolis 7, Indiana

RANSBURG


# Self-Dump Hoppers

HANDLING metal scrap doesn't have to be messy and time consuming. Verson Allsteel Press Co., Chicago turned to self-dumping hoppers and got rid of its wheelbarrows and scoops. Result: A neat, one-man operation.

**Leader**—Verson is a leading maker of stamping presses. Its operations produce a lot of steel filings, turnings, cuttings and other scrap. For best returns, scrap must be segregated and identified. Hand operations made it impossible to keep scrap in separate bins.

ROURA HOPPER
*. . . cleans up a messy job*

Self-dumping Roura hoppers are loaded by one man who moves from one location to the next. As soon as the hoppers are full, he uses a fork truck to take them to semitrailers or railroad cars. A simple pull on a tripper dumps the hopper which returns to an upright position when empty.

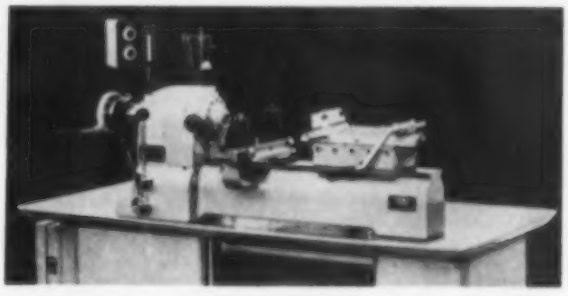
**Practical** — Verson's executive vice president, John Novak, says the hoppers make it easy to keep scrap separated by type. Working areas are departmentalized according to the metals used; each department has its own hopper.

## Lathe Changes Spindle Speeds Without Stopping

A touch of a button on the Model DSM59 second operation machine changes spindle speeds in the 230-to-3500-rpm range.

The machine chucks partially finished parts and uses low-cost tooling in its double-tool cross slide and turret for close tolerance machining.

The lever-operated collet closer can be operated while the machine is in motion. An adjustable operating lever allows rapid turret swiveling past stations which do not have tools. *Write*: Hardinge Bros. Inc., Elmira, N. Y. *Phone*: 6256



## Transmission for Small Gasoline Engines Shifts Automatically

The Trimatic Drive shifts automatically from neutral to low, to high and back to low.

The accelerator does the shifting without jerk or lag.

Low speed is one-half engine speed, while high speed is 80 per cent of engine speed.

The two-speed transmission is adaptable to all engine makes and models which develop up to 3 hp at 3600 rpm. Units with special ratios or larger capacity are available.

The transmission is used on garden tractors, motor scooters, etc. *Write*: Triune Products Co., 23350 Edward St., Dearborn 7, Mich. *Phone*: Logan 2-7874

## Automated Drilling Machine Turns Out 200 Auto Frames an Hour

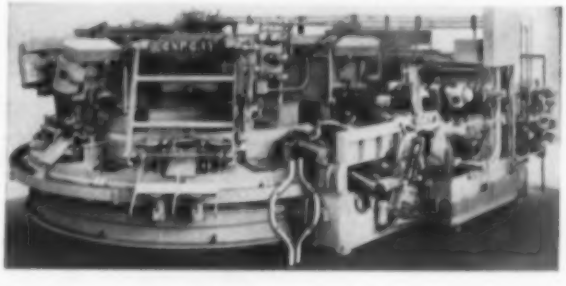
This 12-station special machine combines the features of a 4-station, in-line transfer unit with those of a large, center-column, 8-station rotary index machine.

The electronically controlled machine is hydraulically operated. It drills, spotfaces, reams and deburrs holes in a frame crossmember (39-in. long, 2⅝-in. OD) which is made of bent tubular steel.

The rotary index machine has a cast aluminum, sectional table which is 12 ft in diameter. The light weight of the table, plus a new mechanical cam mechanism, enables a 2-hp motor to do the indexing.

A new leaf spring and overcenter toggle clamping mechanism reduce clamping pressure variations (due to stamping deviations) of parts in the fixtures.

Drilled holes are probed by the machine to check for those which are not finished because of drill breakage. If such defects are found, the machine shuts down automatically.



Parts are loaded first into the in-line transfer unit. Transfer mechanisms move the parts to the index machine and later unload them.

Each transfer device is operated by two hydraulic cylinders. *Write*: Expert Automation Machine Co., 17144 Mt. Elliott Ave., Detroit 12, Mich. *Phone*: Twinbrook 1-4327

# NEW SUTTON 7-Roll STRAIGHTENERS

MODEL 4 KTC (Pictured)
TUBES FROM 3⅛" O.D. to 12" O.D.
BARS FROM 3⅛" to 7½" Dia.

New Sutton 7-roll straighteners are the finest available. Patented cluster roll arrangement positively confines work to pass line from entry to delivery without guides. Roll angles are automatically adjusted to proper setting with full contact between work and rolls.

**STRAIGHTENS EXTERNAL UPSET TUBING, CASING and DRILL PIPE 20 to 50 Times Faster!**

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**SUTTON ENGINEERED STRAIGHTENING**
*May Be Installed Directly In The Mill Line*

*Proposals furnished at no obligation*

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***Manufacturers for Ferrous and Non-Ferrous Metal Industries***

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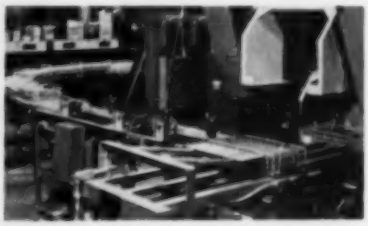
**PHONE: GRANT 1-8077** **PLANT: BELLEFONTE, PA.**


## NEW PRODUCTS and equipment

### Basket Feeder

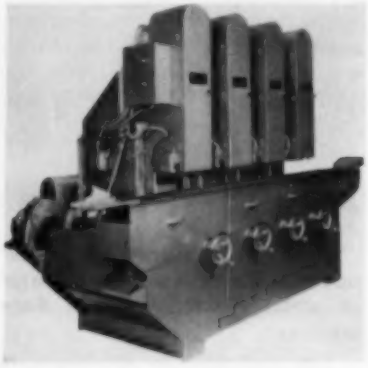
The sectional feeder and unloader transfers baskets to and from standard conveyor systems and process machinery. The feeder and the unloader can be easily adapted to many custom engineered processing systems.



The feeder section and unloader section are available as independent units. *Write*: Circo Equipment Co., 51 Terminal Ave., Clark (Rahway), N. J. *Phone*: Fulton 8-8600

### Abrasive Belt Grinder

This contact-wheel grinder does flat surfacing on four parts at once. It uses a series of progressively finer belts and, in one pass, removes up to 0.020-in. of steel stock.



Model 680-4 does both wet and dry belt grinding. Abrasive belt speed is 5500 sfpm. *Write*: Engelberg Huller Co., 831 W. Fayette St., Syracuse 4, N. Y. *Phone*: 4-3195

### Blast Cleaner

The UB Wheelabrator monorail blast unit cleans parts with internal open cavities, such as cast automotive engine blocks.

Work is placed so that cavities

*Carpenter* ... pioneers in specially-engineered steels through continuing research

# HOW FAR CAN YOU GO

## *in multiplying service life of critical parts?*

Tips were breaking off these fuel injector nozzles for diesel engines within one to 30 days after installation. Result: costly damage to the engines. The nozzle manufacturer was on the spot. He needed a tougher steel . . . and one with greater hardening accuracy because the holes in the nozzle had to be held extremely small.

At this point the company called in Carpenter . . . and a Carpenter-engineered specialty steel was matched to the job. Service life of the nozzles promptly increased from 30 days to an average of two years. And shop fabricating problems literally disappeared.

Every week, more companies like yours are discovering just how far they can go in increasing service life of critical parts . . . reducing fabricating headaches . . . improving product salability. Here's one reason why: Carpenter quality and pioneering ability are backed by one of the largest staffs of skilled metallurgists, per pound of steel produced, in the industry.

Can you honestly afford to remain "satisfied" when this road to improvement lies wide open? Start by sending for a copy of "A Guide to Specialty Steels as Made by Carpenter." *The Carpenter Steel Co., 139 W. Bern St., Reading, Pa.*

**Are you taking advantage of these specially-engineered steels as made by Carpenter?**

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**for product improvement**

## Haul Castings the Economical Sterling Way!

These all-steel, heavy duty trucks come in handy for hauling castings to and from cleaning room. With roller bearing wheels and ball bearing swivel casters, they glide along smoothly, maneuver easily. Save both time and labor. Capacity 2,000 lbs. Sturdy, reinforced welded construction. Write for literature.

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**Sterling**

**FOUNDRY EQUIPMENT**

A 8550-½

*Another of the Reasons Behind Brad Foote Quality—*

## METALLOGRAPHY

• The heat treatment a gear receives is probably the most important single factor in determining its long range wear characteristics. Here at BRAD FOOTE we pride ourselves on having equipment designed to provide the widest possible variety of heat treatments.

• But in addition to standard heat treating and testing equipment we have a few extra safeguards. One of these, rather unusual in our business, is a complete Metallographic laboratory. Specialized equipment allows us to examine or photograph the grain structure of all of our metals, in order to determine the most effective methods of heat treatment and to serve as a check on the quality of finished work.

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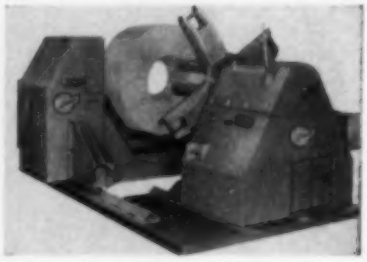
## NEW PRODUCTS and equipment

are exposed to the abrasive shower from a single hurling wheel during the entire period the piece is in the blasting position.

Double chain drives increase the rigidity of the workholding hooks on the conveyor. *Write*: Wheelabrator Corp., Mishawaka, Ind. *Phone*: Blackburn 5-2141

### Coil Loader

The Lift Loader reduces down time for reloading coil stock. Compact design eliminates the necessity for a pit.



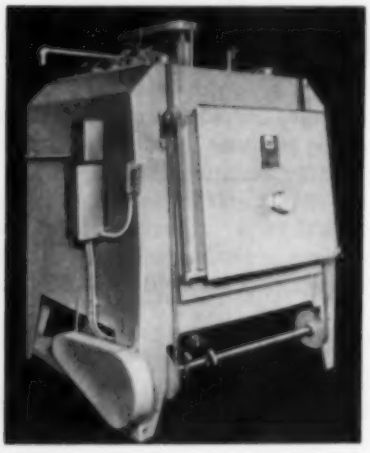
The loader moves laterally on rails. The coil is elevated to align the core and then is transferred to the expander arms of the centering reel.

Multiple coils and weights up to 40,000 lb can be handled. *Write*: Sesco Inc., 8881 Central Ave., Detroit 4, Mich.

### Furnace

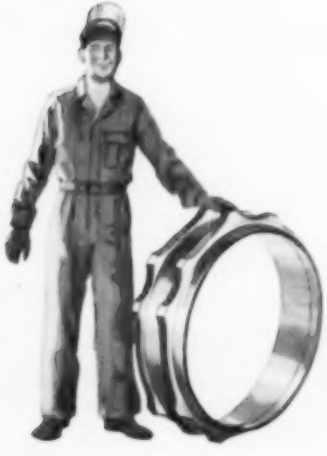
Clean hardening, annealing, carburizing and other atmosphere work are done by this furnace.

Its vertical, alloy radiant tubes



## IT'S CRITICAL

## IT'S COMPLEX . . . . . IT'S FORGED



This critical jet engine "case ring" with its odd protrusions, thin section and large diameter, would have been a designer's dilemma a short time ago.

Today, Cameron's advanced forging technique, developed on some of the world's largest and most unusual presses for ferrous forgings, has opened new vistas of design, high production and economy.

WRITE

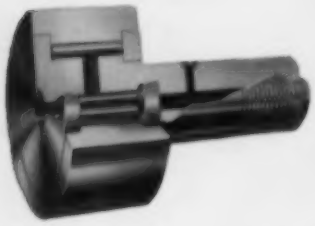
**Cameron**

**IRON WORKS, Inc.**

SPECIAL PRODUCTS DEPARTMENT
P. O. Box 1212, Houston, Texas

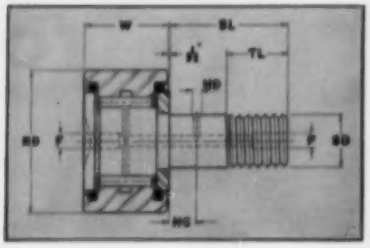
# BEARING TIPS by McGill

## BEARING BUILT FOR HEAVY-DUTY CAM LOADS



Camrol CF Bearings provide the ultimate in radial capacity, shock resistance and space economy for all cam actioned or guide and support roller applications. An extra heavy outer ring operates on a full complement of small diameter rollers supported by an integral inner race, roller retaining flange and stud. Designed as precision replacement for plain bearing or improvised bolt and bearing units.

### *New Sealed Bearing Adds to Versatility of Standard Cam Follower*

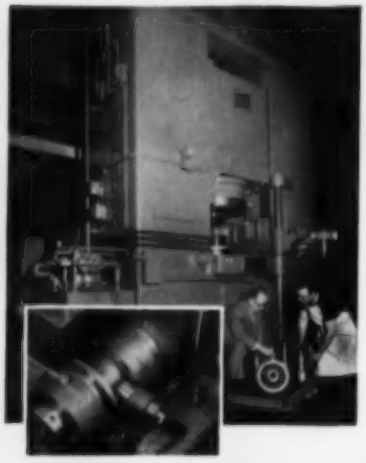



The new SCF series bearing keeps contamination out and lubrication in by means of specially-treated synthetic seals. The SCF bearing is interchangeable dimensionally with standard Camrol bearings.

## 140 Pages of Bearing Facts

Write for your copy of Catalog No. 52, a revised 140-page Bearing Selection Guide. It contains vital product information and 30 pages of engineering data.

## CAMROL CF Bearings Cut Power Requirements on J. L. Ferguson Co. Packaging Machines



### *New Shear-Speed Shapers Achieve Greater Speed and Accuracy Using CAMROL CF Bearings*

Michigan Tool Co. uses Camrol CF and CYR bearings in their new machines that produce gears up to 20 inches in diameter and up to 6-inch face widths in only 13 minutes. These bearings, acting as cam followers, accurately control cutting tool feed and relieve tools from the work on return strokes. They insure dependable, precision performance for automatic operation at high production speeds.

### *Up to 50 Camrol Bearings Used Per Machine*

Used as load-carrying cam followers and as guide rollers in PACKOMATIC packaging machinery, McGill Camrol CF bearings have brought several desirable advantages to J. L. Ferguson Company in the eight years this firm has relied on Camrol Bearings.

Exceeding the performance of the roller and pin assembly formerly assembled in the Ferguson plant, the Camrol cam follower bearing has helped improve a variety of cam actuated operations on many of the versatile packaging machines built by Ferguson.

The Camrol CF bearings eliminate wear by reducing friction. This also reduces power requirements for the machines. The CF bearings cost less and are more easily applied than the previous assembly.

For trouble-free operation, up to 50 bearings per machine are now used by this company.

*Insure performance with* McGILL®

MULTIROL® GUIDEROL® CAMROL
Full Type Roller Bearings

McGILL MANUFACTURING COMPANY, INC., 301 N. LAFAYETTE ST., VALPARAISO, INDIANA

are easily replaced from the top of the furnace. The door is inclined to provide a natural friction seal. Burners and pilots are manifolded together for air and gas connections. *Write*: Standard Fuel Engineering Co., 667 S. Post Ave., Detroit 17, Mich. *Phone*: Vinewood 1-5500

## Shell Mold Resins

Four new resins make feasible the production of shell molds and cores by blowing. They also make production of shell molds with dump boxes more efficient.

One of the resins is for hot coating; the others are recommended for cold coating. All can be used for blowing, but two are especially suitable for dumping. All resins are phenolic formulations. *Write*: Department SY, Monsanto Chemical Co., Springfield, Mass. *Phone*: State 8-6911

## Roller Leveler

Model 11-F flattens mild, hard-tempered and stainless steel, aluminum, brass and copper. It handles widths up to 42 in. and gages from 0.020 to 0.093-in.

The machine straightens sheet stock, produces cut length flat sheet from coil and work anneals deep drawing steel. It also straightens coil stock for automatic feeds used with punch presses.

A single sprocket changes the standard speed of 56 fpm. The 11 straightening rolls and two feed


# Advances in Applied Radiation

DEVELOPMENTS in APPLIED RADIATION ENERGY, its APPLICATIONS and the APPARATUS USED TO PRODUCE IT

**Speeding production radiography** of small castings having high nickel or cobalt content, the x-rays from a one-million-volt Van de Graaff permit clear observation of details in 1/32" and 5/8" thicknesses *in the same exposure*. Heretofore, inspection of such castings has required two x-ray units having different penetration characteristics so that each might be used for a specific region of the casting. But the balance of low- and high-energy components, inherent in the Van de Graaff constant-potential x-ray beam, makes possible a simplified, economical technique. Moreover, the radiographs obtainable with the Van de Graaff are easier to interpret than those made with lower-voltage x-rays because the large grain-size of the high-temperature alloys produces a diffraction pattern with lower-voltage x-rays.

Typical precision castings whose inspection is speeded by million-volt Van de Graaff radiography.

Other examples of advantages gained with the Van de Graaff are given in our 24-page Bulletin R, which also gives full information on the equipment and its installation. *Write today for your free copy.*

HIGH VOLTAGE ENGINEERING CORPORATION

7 UNIVERSITY ROAD CAMBRIDGE 38, MASSACHUSETTS

DURALOY

A good example of our
WELDING
TECHNIQUE
in connection
with high
alloy casting




This tube support is 21'6" long; 6'7" wide and weighs 8900 pounds. It looks like a single casting. Actually it is made up of three sections welded together in zig-zag strips across the face. It's a Duraloy HH casting destined for an oil refinery cracking still.

Welding is assuming greater and greater importance in the production of high alloy castings. Often it is the only way to produce large tonnage or unusually shaped pieces. During our many years of experience in producing both high alloy static and centrifugal castings, we have developed sound welding techniques for such castings. Carbon steel welding techniques won't serve. It takes special know-how for chrome-iron and chrome-nickel.

You can rest assured that if the chrome-iron or chrome-nickel castings you order from us require any welding, it will be done skillfully.

THE DURALOY COMPANY
OFFICE AND PLANT Scottdale, Pa.
EASTERN OFFICE 13 East 41st Street, New York 17, N. Y.
DETROIT OFFICE 2306 Woodward Avenue, Pleasant Ridge, Mich.
CHICAGO OFFICE 332 South Michigan Avenue


## NEW PRODUCTS and equipment

rolls are made of alloy steel, hardened, ground and hard-chrome plated. *Write*: F. A. Woehr Machine Co., 17 Favor St., Rochester 8, N. Y. *Phone*: Locust 6475

### Carbide Tool Grinder

Model OCE-6 can be adapted for conventional or electrolytic grinding. Its oscillating spindle makes it unnecessary for the operator to manipulate the tool. Uniformly flat grinding is assured. The diamond wheel is long lasting because the face is worn uniformly, and frequent dressings are not needed.



The spindle oscillates on a tapered roller bearing rocker, resistant to end and radial thrust.

Wheel oscillations are adjustable between 0 and 70 per minute. The length of stroke can be varied to accommodate tools from ¼ to 2-in. wide when using a ¾-in. face diamond wheel. *Write*: Hammond Machinery Builders Inc., 1611 Douglas Ave., Kalamazoo, Mich. *Phone*: 5-7151

### Refractory Patching

A high magnesia, basic refractory patching mix, 1020 Periclase Patch, has a chemical bond that sets rapidly.

For high-frequency induction

furnace linings it offers: High electrical resistance, the ability to absorb several times its own weight of iron oxide, acquired toughness and long life. *Write*: Kaiser Chemicals Division, Kaiser Aluminum & Chemical Sales Inc., 1924 Broadway, Oakland 12, Calif. *Phone*: Twin Oaks 3-4600

## Production Machine

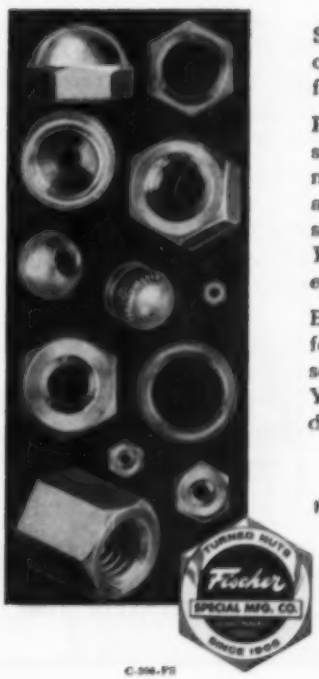
In 1 hour this special machine drills, chamfers and bores the starter hole; reams two dowel holes; spot faces four inside bosses and taps five holes in 120 V-8 clutch housings.

Made with standard components, the machine has six work stations with power clamping and elevating fixtures. *Write*: Michigan Drill Head Co., P. O. Box 4643, Detroit 34, Mich. *Phone*: Jefferson 9-4200

## Automatic Feeder

This air-operated unit is used in blanking, shearing and secondary operations. It feeds a plate of any length, thickness or width.

The feeder can be used for blanking on both forward and return travel of the carriage. Where blank elimination makes fully automatic feeding inadvisable, the




Special and odd size nuts . . . brass or aluminum . . . are "duck soup" for Fischer.

Precision-turned on unique high-speed machinery, Fischer nuts set new standards of uniformity and accuracy that will speed your assembly operations . . . and cut costs. *Yet you pay no more for Fischer's extra quality!*

Before you place your next order for brass or aluminum "specials", send your specifications to Fischer. You will receive prompt price and delivery quotations.

there's no premium for precision with

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C-206-PS

# FAMOUS FIRSTS IN THE IRON & STEEL INDUSTRY

## BIRTHPLACE OF A GIANT

In 1644, twenty-two years after the massacre at Falling Creek, Virginia and the destruction of America's first blast furnace, the first producing ironworks was started on the banks of the Saugus River, halfway between Boston and Salem, Massachusetts. These works included a small blast furnace and a forge.

At the Saugus Works the first casting in America was made by Joseph Jenks. It was for an iron cooking pot of about one quart size. The pot and lid together weighed about 3 pounds, and on the inside measured 4½ inches in width and depth both. From this small casting today's gigantic iron and steel industry has grown.

The J. E. Baker Company is proud of their part in this tremendous growth. To help producers get more uniform ingots and increased furnace efficiency at lower refractory costs, BAKER'S MAGDOLITE, the original dead-burned dolomite was developed. Down through the years, BAKER'S MAGDOLITE has maintained a superior product that is constantly 5 ways better: Composition, Preparation, Strength, Economy and Quality. The next time you order dead-burned dolomite, specify BAKER'S MAGDOLITE.

2-55

**ANOTHER FAMOUS FIRST**

JEBCO PRODUCTS SINCE 1889

**BAKER'S MAGDOLITE**

**The original dead-burned dolomite**

# THE J. E. BAKER COMPANY

**YORK, PENNSYLVANIA • PLANTS: BILLMEYER, YORK, PENNSYLVANIA • MILLERSVILLE, OHIO**

## NEW PRODUCTS and equipment

throwing of two valve levers makes the machine semiautomatic.

It'll work with any press or shear. *Write*: Pollasky Engineering Co., 3802 N. 38th St., Milwaukee, Wis. *Phone*: Hilltop 5-6333

### Band Saw

Special Model J has a cutting capacity of 38-in. rounds or squares. A 3-hp motor drives the saw at speeds of 1000, 1500 and 2000 fpm.

The machine raises hydraulically on two posts. *Write*: W. F. Wells & Sons, Three Rivers, Mich.

### Contour Measuring

This instrument provides a quick and accurate method of checking and inspecting contoured surfaces. It checks radial accuracy of impellers, inducers, nozzles, turbine wheels, blades and two and three-dimensional cams.

The need for intricate setups and layouts is eliminated. *Write*: Summit-Roberts Products Inc., 830 New York Ave., Toledo, O. *Phone*: Pontiac 3474

### Greaseproof Wrap

Super Induwrap, a Grade A greaseproof wrap, uses Mylar as the barrier material. Mylar, a polyester film, has greater strength and thermal stability qualities than acetate or polyethylene which frequently are used on Grade A wraps.

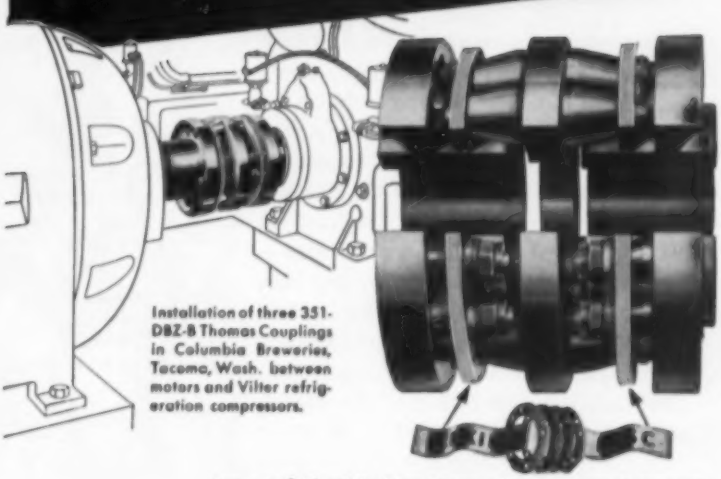
Mylar resists grease penetration indefinitely and will withstand effects of acids and alkalies. It is fungus and bacteriaproof and will not ignite should it be exposed to flame.

For metal parts it meets the packaging specification JAN-B-121.

The polyester film is laminated with a neutral adhesive to red-striped neutral kraft. It is then creped-to-stretch to give the product the added advantage of moldability in packaging.

The wrap is made in heavy and medium grades in 36-in. rolls or sheets cut to the user's require-


THOMAS FLEXIBLE COUPLINGS...
for more years of better service!



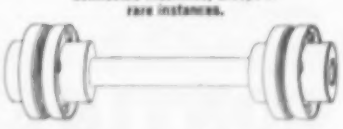
Installation of three 351-DBZ-B Thomas Couplings in Columbia Breweries, Tacoma, Wash. between motors and Vilter refrigeration compressors.

Patented Flexible Disc Rings of special steel transmit the power and provide for parallel and angular misalignment as well as free end float.

DISTINCTIVE ADVANTAGES

| FACT | EXPLANATION |
|---|---|
| NO MAINTENANCE | Requires No Attention. Visual Inspection While Operating. |
| NO LUBRICATION | No Wearing Parts. Freedom from Shut-downs. |
| NO BACKLASH | No Loose Parts. All Parts Solidly Bolted. |
| CAN NOT "CREATE" THRUST | Free End Float under Load and Misalignment. No Rubbing Action to cause Axial Movement. |
| PERMANENT TORSIONAL CHARACTERISTICS | Drives Like a Solid Coupling. Elastic Constant Does Not Change. Original Balance is Maintained. |

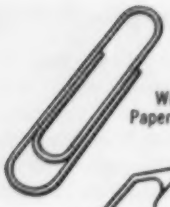
Thomas Couplings are made for a wide range of speeds, horsepower and shaft sizes and can be assembled or disassembled without disturbing the connected machines, except in rare instances.



THOMAS

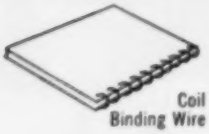
Write for our new Engineering Catalog No. 51A

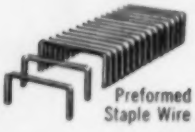
THOMAS FLEXIBLE COUPLING COMPANY
Largest Exclusive Coupling Manufacturer in the World
WARREN, PENNSYLVANIA, U.S.A.


Wire for Paper Clips

Piano Covering Wire

*Whatever your problem is in* **Wire...**


Coil Binding Wire


Preformed Staple Wire

Wire for Milk Bottle Carriers

Florist Wire

Thousands of wire applications in over a half century—involving virtually every kind of a wire problem—that's the experience and background we offer you in solving *your* special wire problems. We can supply wire from almost the size of a human hair, through 9/16" diameter for metal fasteners . . . round wire or wire in special shapes, practically any size, temper, finish and analysis in low carbon and medium low carbon steels. We may have a valuable case history that parallels your own special problem. Fill out and return the coupon for full details of Continental's Wire Service. We are eager to work with you.

Wire Bales for Buckets, Pails, etc.

Wire for Toy Wheels

Standard and Special Wire Shapes

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Gentlemen: Please give us without obligation complete details of your special wire service.

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**CONTINENTAL**

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PRODUCERS OF: Manufacturer's Wire in many sizes, shapes, tempers, and finishes, including Galvanized, KOKOTE, Flame-Sealed, Coppered, Tinned, Annealed, Liquor Finished, Bright, and special wire. ALSO Coated and Uncoated Steel Sheets, Nails, Continental Chain Link Fence, and other products.


## NEW PRODUCTS and equipment

ments. It also can be made to order in flat form. *Write*: Angier Corp., Framingham, Mass. *Phone*: Trinity 2-3545

### Broaching Machines

ElectroGear dual-ram, vertical broachers have a capacity of 15 tons. Five models are available, with stroke lengths of 54, 66, 80, 90 and 100 in.

Interaction of the ascending and descending rams gives balanced power loading. This feature, combined with helical pinion rack drives, results in exceptional smoothness.

Broaching speeds go to 80 fpm or more. Ram speeds are infinitely variable. *Write*: Colonial Broach & Machine Co., P. O. Box 37, Harper Station, Detroit 13, Mich. *Phone*: Jefferson 6-2550

### Carbide Milling

Throwaway insert milling cutters never need sharpening. They use low-cost disposable blades which have eight quickly indexable cutting edges. Uses: High speed, high feed cutting on cast iron and steel.

Negative radial and axial rake

two different sizes in one
Exclusive New DUO-SIZE End Mills...
Here's money-saving news for toolrooms and job shops! Now you can cover the size range of 14 regular end mills, using only 7 new, exclusive Brown & Sharpe Duo-Size End Mills. Each Duo-Size Mill has ends of different diameters . . . cuts your toolroom costs. Duo-Size End Mills give you all the advantages of other Brown & Sharpe End Mills.
And, with each complete set of 7 sizes, you get a sturdy wooden holder, for your convenience.
Duo-Size End Mills are available in ranges of 7 mills each, right-hand, from 3/32" to 1" with either two or four flutes, 30° helix. For complete details, write Brown & Sharpe Mfg. Co., Providence 1, R. I.
BUY THROUGH YOUR LOCAL DISTRIBUTOR
Brown & Sharpe
B&S

YOU'LL MAKE MORE PROFIT WHEN YOU

# FIGHT CORROSION

## with ESCO Heat-Treated High Alloy Steel Castings

BEFORE

AFTER

These photomicrographs illustrate importance of proper heat treatment in "locking" carbides in solution to produce extra high corrosion resistance.

Laboratory accelerated corrosion test checks result of heat treatment.

## ESCO ALLOY CASTINGS OUTLAST OTHERS MANY TIMES!

A wide range of ESCO High Alloy Products is available for critical conditions of Heat and Corrosion.

- Pipe and Flanges
- Heavy-Duty Valves
- Standard and Special Flanged Fittings
- Screwed Fittings
- Welding Fittings
- Kiln Cooler and Roaster Parts
- Refinery Castings
- Heat-Treating Parts
- Conveyor Chains

A big reason for the *unusually high* corrosion resistance of *ESCO* Alloy steel castings is the advanced technique of heat-treating and water quench developed at *ESCO*. It takes only *30 seconds* for a load of steel castings to pass from the oven into an 8000-cubic-foot water quenching tank! Capacity, and speed of quench illustrates a typical *ESCO* answer to a tough production problem. For only with such facilities can you be assured the uniformly high corrosion resistance of *ESCO* Stainless steels.

*ESCO* has solved many tough heat and corrosion problems for industry as part of its application engineering and foundry service! *ESCO* maintains one of the largest foundry metallurgical laboratories in the country to help you with really tough corrosion problems. Your inquiry is invited. Write for full details or ask for informative Brochure *175*.

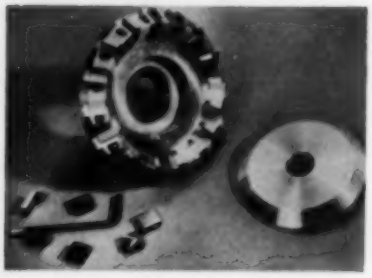
ESCO

Offices and Warehouses: Honolulu, Hawaii; Houston, Texas; New York, New York; Los Angeles, San Francisco, California; Seattle, Spokane, Washington; Centralia, Pennsylvania; Eugene, Medford, Oregon; Salt Lake City, Utah. In Canada: Vancouver, B. C., and Toronto, Ontario.

**ELECTRIC STEEL FOUNDRY CO.**

2160 N. W. 25th AVE., PORTLAND 10, OREGON 1017 GRIGGS ST., DANVILLE, ILL.


## NEW PRODUCTS and equipment



combinations provide ample clearance. The cutters are engineered to meet individual jobs. *Write*: Wesson Co., 1220 Woodward Heights Blvd., Detroit 20, Mich. *Phone*: Jordan 6-1500

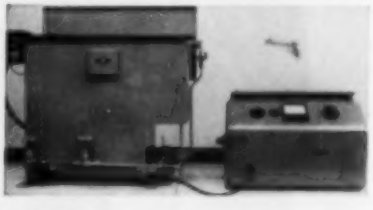
### Welding Cable Reel

Model EA handles up to 100 ft of 2/0 cable at 300 amps. A heavy-duty spring and gear mechanism retracts the cable when not in use.

A simple pawl arrangement locks the cable at any desired length. The reel can be mounted in any position. *Write*: United Specialties Inc., P.O. Box 698, El Dorado, Ark.

### Ultrasonic Degreasers

Two cleaning stages, vapor degreasing and ultrasonic solvent cleaning, are combined in this unit.



Workpieces 10 x 8 x 8 in. can be cleaned. Maximum power consumption is about 2500 watts.

Solvents such as trichlorethylene

can be used. *Write*: Industrial & Scientific Products Division, Curtiss-Wright Corp., Caldwell, N. J. *Phone*: Caldwell 6-7200

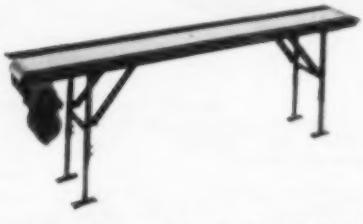
## Powdered Metal Gears

Super-Olite gears are rough formed by pressing powdered metal into dies. In later steps they are submerged in an oil bath, heat treated and finish ground.

The gears are held to tolerances of 0.0005-in., lower if desired. They are made in standard sizes to 4-in. OD and 2½-in. thick. *Write*: A. A. Specialty Gear Co. Division, A. A. Grinding Co., 12327 Edwin Ct., Cleveland 12, O. *Phone*: Sweetbriar 1-4111

## Assembly Top Conveyor

The JPH-75 Power Helper has a slider bed only 2¾-in. thick. Seated workers have plenty of leg room and a working surface that permits a normal posture for assembly, inspection and other operations on small, light parts and assemblies.



The unit comes in 5, 10 and 15-ft lengths. Frame widths are 12, 18 and 22 in., with belt widths of 6, 12 and 16 in. Extended work aprons which are 9 in. wide are available. *Write*: Metzgar Conveyor Co., 409 Douglas St. N. W., Grand Rapids 4, Mich. *Phone*: Glendale 6-1751

## Correction

Brown & Sharpe hand screw machines are not equipped with the Spray-Lube system described on page 123 of the Apr. 30 issue of STEEL. The system illustrated was applied by C. A. Norgren Co., maker of Spray-Lube systems.


Q. Which is the only Grit combining
LONG LIFE
+ HIGH HARDNESS
+ SUPER ETCH ACTION
= Lowest Cost Etched Finish

A. STEELETTS®
— the NEW Steel Grit

Wheelabrator Steeletts, the new high carbon steel grit, are the answer to savings in abrasive costs because they clean and etch faster, last longer and etch more deeply and uniformly. They are also the answer to equipment maintenance because unlike ordinary chilled iron grit, Steeletts resist breakdown and reduce formation of sharp edges that cause excessive wear.

Steeletts open the surfaces of the work, exposing lustrous virgin metal. The etched surface created by Steeletts reflects and diffuses light — sun bright cleanliness is uniformly obtained.

Only Steeletts have the toughness, hardness and performance required for economical blast cleaning operations. Try Steeletts and see for yourself how they will provide the lowest cost etched finish.

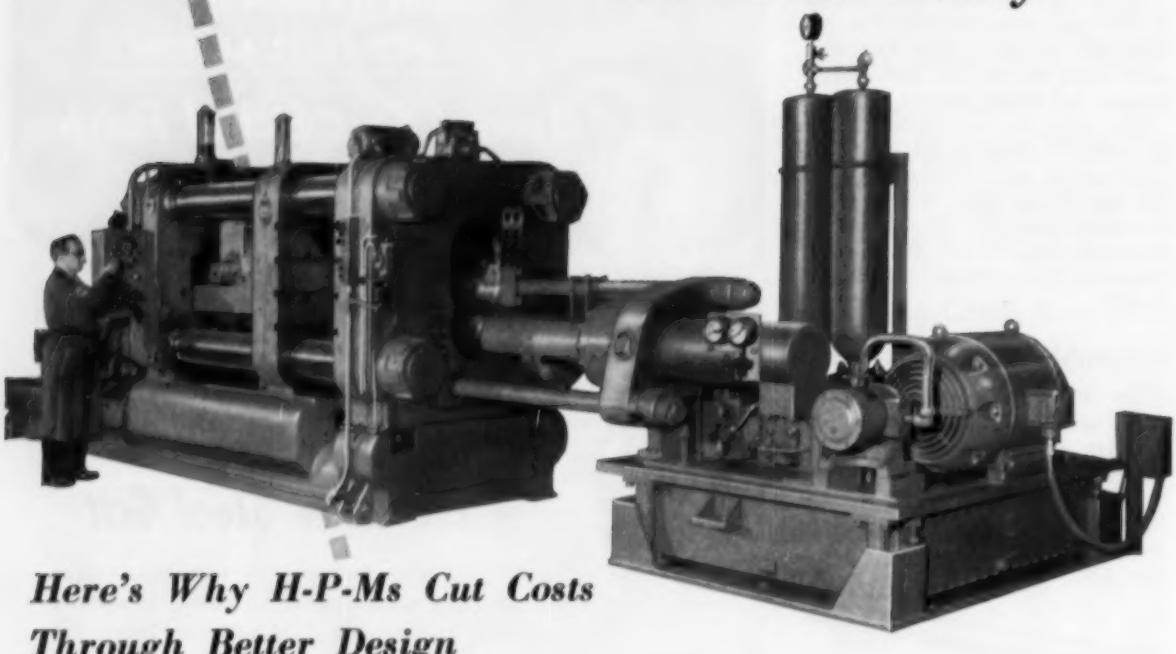
*For complete information on Steeletts, write today for Bulletin No. 901-D.*

WHEELABRATOR CORPORATION

509 South Byrkit Street Mishawaka, Indiana

# IF YOU DIE CAST . . .

## *H-P-Ms Give You More For Your Money*



## *Here's Why H-P-Ms Cut Costs Through Better Design*

H-P-M die casting machines are the answer to many of today's die casting problems . . . production output to meet any job requirement . . . cleaner castings . . . negligible flash . . . parts produced to accurate dimensional tolerances with improved quality and density. H-P-M's new design, mechanical link wedge clamp and new injection end, results in a new approach to die casting techniques. Here's why H-P-Ms are the best buy:

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DIE CASTING DIVISION

**THE HYDRAULIC PRESS MFG. CO.**

Mount Gilead, Ohio, U.S.A.

HPM

# NEW Literature

Write directly to the company for a copy

### Magnetic Loop Control

Bulletin GEA-6486, 2 pages, describes magnetic loop control for steel mill pickling lines. General Electric Co., Schenectady 5, N. Y.

### Belt Conveyors

Carrier units and other accessories for belt conveyors are described in bulletin 355. Stephens-Adamson Mfg. Co., Aurora, Ill.

### Steel Strapping

A 44-page catalog lists ideas to speed packaging, lower handling costs and assure safe shipment. Acme Steel Products Division, Acme Steel Co., 2840 Archer Ave., Chicago 8, Ill.

### Knitted Wire

Bulletin A-1 gives advantages of knitted stainless and nickel-alloy wire products. Alloy Metal Wire Division, H. K. Porter Company Inc., Prospect Park, Pa.

### Hardness Testers

Bulletin DH-328, 12 pages, covers Tukon testers for micro and macro hardness testing. Wilson Mechanical Instrument Division, American Chain & Cable Co. Inc., 929 Connecticut Ave., Bridgeport 2, Conn.

### Stainless Steel Chart

Designations, analyses and properties of corrosion-resistant stainless steels are given in bulletin 556-C, 4 pages. Empire Steel Castings Inc., Reading, Pa.

### Spray Painting

Production line uses of electrostatic spray painting are depicted in a 16-page bulletin. Ransburg Electro-Coating Corp., Barth & Sanders Sts., Indianapolis 7, Ind.

### Bulk Conveyors

Bulletin 455, 12 pages, describes the design and use of bulk material conveyors. Department NLP, Jervis B. Webb Co., 8951 Alpine Ave., Detroit 4, Mich.

### Gravity Roller Conveyors

Bulletin 100, 20 pages, depicts various types of gravity roller conveyors in use. Harry J. Ferguson Co., Jenkintown, Pa.

### Condenser Tubes

Points to be considered in purchasing or specifying welded stainless tubing are detailed in a 12-page


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## AIR PRESSURE REGULATORS

*Accurate, Dependable Control of Air Pressure*

***There's a Norgren Regulator for Every Air Regulation Need.***

All air-operated equipment is designed to operate most efficiently at one specified air pressure. Pressures in excess of this specified pressure result in greater wear, more downtime, higher maintenance cost and waste of air. You can select a Norgren Regulator that will provide the desired pressure at all times, holding it constant even though the line pressure or rate of flow may vary.

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Norgren Pressure Regulators are precision built throughout to provide accurate pressure regulation under the most rugged conditions.

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Norgren Pressure Regulators respond quickly to sudden demands for greater air volume without an excessive momentary pressure drop.

**3. EFFICIENT OPERATION**
A baffle plate and siphon tube permits greater air flow with less pressure drop and protects the diaphragm against sudden pressure surges and chatter.

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The diaphragm in Norgren Pressure Regulators is made of oil-resistant synthetic rubber reinforced with nylon fabric.

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The built-in relieving feature available on all models safeguards connected equipment against damage through pressure surges—permits downward adjustment of pressure without auxiliary "bleeding" of line.

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Pipe connections are straight through for easy installation. In addition, most models can be completely dismantled without removing them from the air line.

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**NEARLY 400 STANDARD MODELS**

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Relieving feature provides added protection against excessive pressure build-up. Permits downward adjustment of pressure without "bleeding" of line. Maximum allowable primary pressure is 450 psi; adjustable delivery pressure is 2 to 250 psi. Pipe sizes—⅛" to 1" inclusive. Series 2AX.

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For precise control of air pressure in the range of 0 to 2 cfm. Specially suited for use with air-controlled instruments. Maximum allowable primary pressure is 400 psi; adjustable delivery pressure is 1 to 30 psi. Relieving type. Pipe size—¼". Series 11,400.

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A precisely controlled air cushion provides an extended adjustable range, more accurate pressure regulation, increased capacity to 60 cfm. Maximum allowable primary pressure is 400 psi; adjustable delivery pressure is 2 to 120 psi. Pipe sizes—½", ¾", 1". Series 20AA

an ACCO product

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NEW!
Accoloy X-Weld 125 Chain
Welds as strong or stronger than alloy material. Welded area 2¼ times conventional size area.
NEW!
Shaped Section Master Link
Holds its form under loads up to 18% greater.

*Trade Mark Registered

## NOW—Better and Safer than Ever!

• ACCO *Registered* Chain Slings—long recognized as the standard of excellence—now give users a double bonus of safety and quality. They incorporate ACCO's new Shaped Section Master Link plus ACCO's sensational Accoloy X-Weld 125 chain.

The new Shaped Section Master Link, without any increase in weight, withstands deformation under loads up to 18% greater than a standard round section can. And the Accoloy X-Weld 125 chain—with its extra-strong, king-size welded area and its non-kinking feature—assures extra ruggedness and better service.

Because of these two spectacular improvements, there is more reason than ever for standardizing on ACCO *Registered* Slings. For additional interesting information, call your ACCO *Registered* Distributor—or write our nearest District Office.

**WHAT "ACCO REGISTERED" MEANS . . .**

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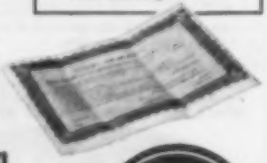
3. Proof test of complete sling to twice the working load limit
4. Actual field service test of each design
5. Metal identification ring on each sling
6. Signed Registry Certificate with each sling



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American Chain Division

AMERICAN CHAIN & CABLE

York, Pa., Atlanta, Boston, Chicago, Denver, Detroit, Houston, Los Angeles, New York, Philadelphia, Pittsburgh, Portland, Ore., San Francisco, Bridgeport, Conn.

## NEW LITERATURE

bulletin on heat exchanger and condenser tubes. Steel & Tubes Division, Republic Steel Corp., Cleveland 8, O.

### Motor Dimensions

A data sheet gives dimensions of the new NEMA motors (from 1 to 30 hp). ACEC Electric Corp., 40 E. 49th St., New York 17, N. Y.

### Chromium and Manganese

A 4-page folder gives the properties and uses of 99-per-cent-pure electrolytic chromium and manganese. Electro Metallurgical Co., division of Union Carbide & Carbon Corp., 30 E. 42nd St., New York 17, N. Y.

### Tubing

Bulletin TDC-154A, 6 pages, gives maximum allowable stress values for ferrous pipe and tubing at elevated temperatures. Tubular Products Division, Babcock & Wilcox Co., Beaver Falls, Pa.

### Transmissions

Planetary gear transmissions are described in an 8-page bulletin. American Gear & Mfg. Co., New avenue, Lemont, Ill.

### Storage Shelving

Planning information on shelving in more than 1000 combinations is given in a catalog. Hallowell Division, Standard Pressed Steel Co., Jenkintown, Pa.

### Pallet Dollies

Magnesium pallet dollies in 14 sizes are described in a bulletin. Magline Inc., 1900 Mercer St., Pinconning, Mich.

### Resistance Welders

Bulletin G-100, 6 pages, presents both standard and special welders. Precision Welder & Flexopress Corp., 3520 Ibsen Ave., Cincinnati 9, O.

### Electric Tools

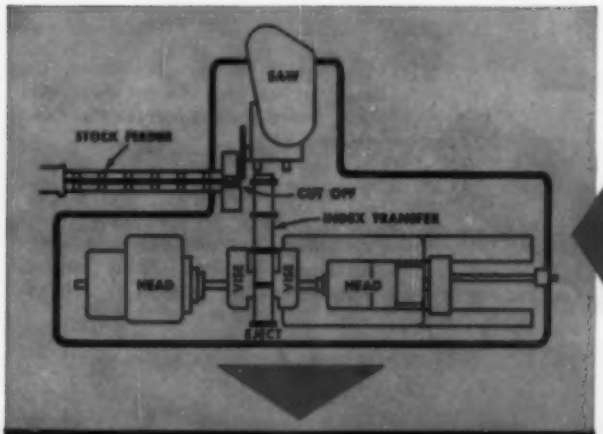
Tools for use in the automotive, industrial, construction, maintenance and trade crafts are covered in a 44-page catalog. Thor Power Tool Co., Aurora, Ill.

### Fittings

Straight-thread fittings are described in bulletin ST-56, 24 pages. L&L Mfg. Co., Van Dyke, Mich.

### Welding Accessories

Catalog 24, 48 pages, covers welding helmets, hand shields, electrode holders, a weld test machine, weld-




# HOT BED OF ACTIVITY

Motch & Merryweather's new transfer machine widens the horizon for the simultaneous double-end machining of bar stock or tubing. Combined with cut-off to accurate length are: centering, chamfering, turning, drilling, or boring. Box mill turning is performed along with center drilling and chamfering. From stock pile to discharge, all operations can be fully automated. For the quickest answer to speed your stock processing, send us your part drawing.

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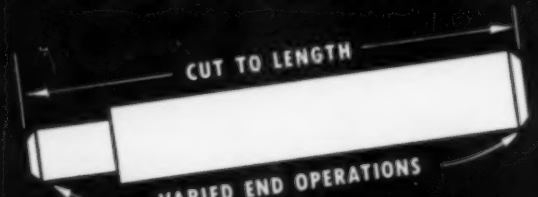
## STOCK CUT OFF and DOUBLE END MACHINING




**THE MOTCH & MERRYWEATHER MACHINERY CO.**

*MACHINERY MANUFACTURING DIVISION*

CLEVELAND 13, OHIO

*M & M No. 60-TB transfer machine. Two models handle lengths up to 60" and diameters to 4".*

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abrasive tools

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Weighs in at a mere 3½ ounces!
Only 3¾" long!
Powerful vane-type motor.
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At 50,000 RPM, this tiny Buckeye Mini-Grinder stirs up a storm of power that gets an amazing amount of work done in a hurry. No bigger—or heavier—than a pen-type flashlight, the Mini-Grinder can be used for precision grinding in the smallest work areas. Sturdy, all-steel construction. Complete kit, packaged in sturdy tool box, includes mounted points, hose and connections, vitalizer (lubricator-filter), wrenches and dressing stone.

Catalog A-10 contains data and specifications on all Buckeye abrasive tools—write for your copy today!

Buckeye Tools
CORPORATION
DIVISION 12 • DAYTON 1, OHIO

producers of the world's first successful rotary air tools

## NEW LITERATURE

ing cables, chipping hammers and many other products for safe welding. Fibre-Metal Products Co., Chester, Pa.

### Press Controls

Advantages of controls designed specifically for presses are given in a 12-page catalog. Danly Machine Specialties Inc., 2100 S. Laramie Ave., Chicago 50, Ill.

### Coolants

Water-based products for machining are described in a 16-page catalog. Department C, F. E. Anderson Oil Co. Inc., Portland, Conn.

### Crane Electrification

A 36-page catalog describes mobile safety electrification systems for cranes, monorails and all moving machinery. Insul-8 Corp., 1369 Industrial Rd., San Carlos, Calif.

### Railroad Lubrication

A flange lubricator and lubricating sticks for reducing wheel maintenance on rolling stock equipment are presented in a 4-page bulletin. Railway Division, Transall Inc., 109 N. 11th St., Birmingham 3, Ala.

### Transfer Switches

Bulletin 596, 16 pages, covers the factors to consider in the selection of automatic transfer switches. Automatic Switch Co., 391 Lakeside Ave., Orange, N. J.

### Power Distribution

Here's information on distribution system planning, operation and other data on system-engineered equipment for industrial power distribution—bulletin GED-3039, 48 pages. General Electric Co., Schenectady 5, N. Y.

## NEW BOOKS

*ASME HANDBOOK: Engineering Tables,* edited by Jesse Huckert, McGraw-Hill Book Co. Inc., 330 W. 42nd St., New York 36, N. Y. 704 pages, $12.

Here is information on the design of parts. Tables cover: Bar stock and shafting; spur, helical, herringbone, bevel and worm gears; cylindrical fits; keys and keyseating; bolts; springs; aircraft and mechanical tubing; serrations and splines; electrical motors and gaskets.

# "These *Payoffpaks* of CHASE® wire sure cut our wire forming costs!"

## *NOW* you can form miles of wire with no costly down time

In this new PAYOFFPAK you get a continuous length of Chase copper alloy wire up to a total of 400 to 500 pounds in weight.

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**NEW!** Chase's informative wire and rod movie: "IN THE CHIPS." Arrange for a free loan of this film by contacting the Chase warehouse or sales office near you. Write on your company letterhead, today!

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This amazing record of 24.6 years average service by plant *and* office personnel represents the skill and experience that produces the famous quality of Follansbee cold rolled strip.

Top quality control engineers guide this unmatched skill to obtain a product that meets rigid specifications—theirs *and yours.*

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## STEEL CORPORATION

FOLLANSBEE, WEST VIRGINIA

**Cold Rolled Strip • Seamless Terne Roll Roofing • Polished Blue Sheets and Coils**

*Sales Offices in Principal Cities*

STEEL

May 21, 1956

# Market Outlook

**STEEL** market speculation centers on the possibility of an industry-wide strike and an across-the-board increase in product prices around mid-year.

Should steelworkers win a substantial wage hike (15 cents per hour or more, not to say anything of fringe benefits) and a strike is averted, prices will immediately go up sharply—to compensate for the increased wage burden and to help finance projected expansion programs.

**ONLY A GUESS**— No one knows whether there will be a strike. You can get a bet on either side.

What will price hikes amount to? The principals don't know what impact wage negotiations will have on costs. It is figured that to provide for a sizable wage boost and minimum needs for expansion, a price hike of as much as $20 per ton would be required. Such a figure seems highly unlikely. But $8 to $12 per ton doesn't seem too farfetched.

**CONSUMERS ALERTED**— No matter what happens, buyers know they will have to pay more for any steel delivered to them in the last half of the year. In fact, prices have been slowly, but steadily, rising for some time—largely in the way of increases on extras.

Latest upward revisions came last week, including: Chemical content extras on alloy steel, carbon special quality bars, carbon rods, wire and semifinished products; width and gage extras for alloy plate and alloy sheet and strip; and the electric furnace extra for alloy bars, rods, wire and semifinished.

**COMPOSITES STEADY**—The increases in extras are not reflected in STEEL's composite, which is compiled from base prices. Finished steel continues at $128.98, malleable iron at $61.27, No. 2 foundry iron at $60.27 and basic iron at $59.80.

Meanwhile, the downtrend in scrap that developed several weeks back continues. This is reflected in a sharp drop in STEEL's scrap composite, now standing at $51, against a high of $55.33 at the end of April.

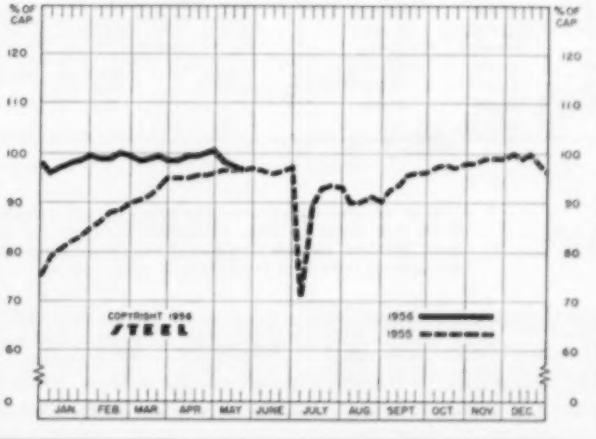
**DEMAND SLOWING**—While over-all demand for finished steel products continues strong, pressure is definitely off in some products, notably the light, flat-rolled items and bars. Structurals, plates and tubular goods continue tight.

Slower demand on automotive account is reflected in the steadily improving supply of sheets, especially cold rolled. Hot rolled, while more freely available, is still fairly tight. As a result of the slower sheet demand, sheetmakers are offering customers extra tonnage allotments for July and August. Some of them are turning out more strip plate.

**INVENTORIES RISING**—Some consumers are accumulating inventories. (To what extent is not known.) This has been in anticipation of a possible work stoppage this summer. The fact some consuming lines, including appliances, continue to order steel although they are beginning to curtail production schedules supports the view considerable hedge buying is being done.

**PRODUCTION**—Steel mills reduced operations 1 point last week to 96.5 per cent of capacity.

## NATIONAL STEELWORKS OPERATIONS




## DISTRICT INGOT RATES

(Percentage of Capacity Engaged)

| | Week Ended May 20 | Change | Same Week 1955 | Same Week 1954 |
|---|---|---|---|---|
| Pittsburgh | 100.5 | + 0.5* | 99 | 69.5 |
| Chicago | 99 | — 0.5* | 98 | 83.5 |
| Mid-Atlantic | 98.5 | — 0.5 | 96 | 87 |
| Youngstown | 101 | + 3 | 98 | 66 |
| Wheeling | 97 | — 4 | 95.5 | 82.5 |
| Cleveland | 97 | + 1.5 | 98.5 | 70.5 |
| Buffalo | 105 | 0 | 104.5 | 67.5 |
| Birmingham | 23.5 | 0 | 93.5 | 76 |
| New England | 87 | — 2 | 88 | 57 |
| Cincinnati | 94.5 | + 1.5 | 91 | 59.5 |
| St. Louis | 93.5 | — 3 | 106 | 72.5 |
| Detroit | 98 | + 1 | 88.5 | 65.5 |
| Western | 109 | 0 | 103 | 74.5 |
| National Rate | 96.5 | — 1 | 96.5 | 70 |

## INGOT PRODUCTION‡

| | Week Ended May 20 | Week Ago | Month Ago | Year Ago |
|---|---|---|---|---|
| INDEX (1947-1949=100) | 148.6† | 145.9 | 153.5 | 145.5 |
| NET TONS (In thousands) | 2,355† | 2,343 | 2,466 | 2,338 |

*Change from preceding week's revised rate. †Estimated. ‡Amer. Iron & Steel Institute. Weekly capacity (net tons): 2,461,893 in 1956; 2,413,278 in 1955; 2,384,549 in 1954.

Metalworking Outlook—p. 63 Technical Outlook—p. 109

# Price Indexes and Composites

### FINISHED STEEL PRICE INDEX (Bureau of Labor Statistics)

| | May 15 1956 | May 8 1956 | Month Ago | Apr. Average |
|---|---|---|---|---|
| (1947-1949=100) | 158.0 | 158.0 | 157.1 | 157.1 |

### AVERAGE PRICES OF STEEL (Bureau of Labor Statistics)

Week Ended May 15

Prices include mill base prices and typical extras and deductions. Units are 100 lb except where otherwise noted in parentheses. For complete description of the following products and extras and deductions applicable to them, write to STEEL.

| | | | |
|---|---|---|---|
| Rails, Standard, No. 1 | $4.800 | Sheets, Electrical | $10.175 |
| Rails, Light, 40 lb | 6.217 | Strip, C.R., Carbon | 5.243 |
| Tie Plates | 5.625 | Strip, C.R., Stainless, 403 (lb) | 0.444 |
| Axles, Railway | 8.350 | Strip, H.R., Carbon | 5.606 |
| Wheels, Freight Car, 33 in. (per wheel) | 52.50 | Pipe, Black, Buttweld (100 ft) | 16.997 |
| Plates, Carbon | 5.200 | Pipe, Galv., Buttweld (100 ft) | 21.137 |
| Structural Shapes | 4.987 | Pipe, Line (100 ft) | 170.038 |
| Bars, Tool Steel, Carbon (lb) | 0.460 | Casing, Oil Well, Carbon (100 ft) | 165.120 |
| Bars, Tool Steel Alloy, Oil Hardening Die (lb) | 0.540 | Casing, Oil Well, Alloy (100 ft) | 252.243 |
| Bars, Tool Steel, H. R., Alloy, High Speed W 6.75, Cr 4.5, V 2.1, Mo 5.5, C 0.60 (lb) | 1.185 | *Tubes, Boiler (100 ft)* | *41.530* |
| Bars, Tool Steel, H.R., Alloy, High Speed W-18, Cr 4, V 1 (lb) | 1.680 | Tubing, Mechanical, Carbon (100 ft) | 21.360 |
| Bars, H.R., Alloy | 9.425 | Tubing, Mechanical, Stainless, 304 (100 ft) | 178.887 |
| Bars, H.R., Stainless, 303 (lb) | 0.450 | Tin plate, Hot-dipped, 1.25 lb | 9.333 |
| Bars, H.R., Carbon | 5.500 | Tin Plate, Electrolytic, 0.25 lb | 8.033 |
| Bars, Reinforcing | 5.313 | Black Plate, Canmaking Quality | 7.133 |
| Bars, C.F., Carbon | 8.800 | Wire, Drawn, Carbon | 8.575 |
| Bars, C.F., Alloy | 12.275 | Wire, Drawn, Stainless 430 (lb) | 0.590 |
| Bars, C.F., Stainless, 302 (lb) | 0.475 | Bale ties (bundle) | 6.537 |
| Sheets, H.R., Carbon | 5.345 | Nails, Wire, 8d Common | 8.598 |
| Sheets, C.R., Carbon | 6.214 | Wire, Barbed (80-rod spool) | 7.847 |
| Sheets, Galvanized | 7.779 | Woven Wire Fence (20-rod roll) | 18.635 |
| Sheets, C.R., Stainless 302 (lb) | 0.588 | | |

### STEEL's FINISHED STEEL PRICE INDEX*

| | May 16 1956 | Week Ago | Month Ago | Year Ago | 5 Yrs. Ago |
|---|---|---|---|---|---|
| Index (1935-39 av.=100) | 210.45 | 210.45 | 209.16 | 194.53 | 171.92 |
| Index in cents per lb | 5.701 | 5.701 | 5.665 | 5.270 | 4.657 |

### STEEL's ARITHMETICAL PRICE COMPOSITES

| | | | | | |
|---|---|---|---|---|---|
| Finished Steel, NT* | $128.98 | $128.98 | $128.02 | $118.45 | $106.32 |
| No. 2 Fdry Pig Iron, GT | 60.27 | 60.27 | 60.27 | 56.54 | 52.54 |
| Basic Pig Iron, GT | 59.80 | 59.80 | 59.80 | 56.04 | 52.16 |
| Malleable Pig Iron, GT | 61.27 | 61.27 | 61.27 | 57.27 | 53.27 |
| Steelmaking Scrap, GT | 51.00 | 53.00 | 55.00 | 24.83 | 44.00 |

*For explanation of weighted index see STEEL, Sept. 19, 1949, p. 84; of arithmetical price composite, STEEL, Sept. 1, 1952, p. 130.

# Comparison of Prices

Comparative prices by districts, in cents per pound except as otherwise noted. Delivered prices based on nearest production point.

| FINISHED STEEL | May 16 1956 | Week Ago | Month Ago | Year Ago | 5 Yrs. Ago |
|---|---|---|---|---|---|
| Bars, H.R., Pittsburgh | 4.65 | 4.65 | 4.65 | 4.30 | 3.70 |
| Bars, H.R., Chicago | 4.65 | 4.65 | 4.65 | 4.30 | 3.70 |
| Bars, H.R., deld. Philadelphia | 4.92 | 4.92 | 4.92 | 4.55 | 4.20 |
| Bars, C.F., Pittsburgh | 4.25* | 4.25* | 4.25* | 5.40 | 4.55 |
| Shapes, Std., Pittsburgh | 4.60 | 4.60 | 4.60 | 4.25 | 3.65 |
| Shapes, Std., Chicago | 4.60 | 4.60 | 4.60 | 4.25 | 3.65 |
| Shapes, deld., Philadelphia | 5.00 | 5.00 | 5.00 | 4.53 | 3.91 |
| Plates, Pittsburgh | 4.50 | 4.50 | 4.50 | 4.225 | 3.70 |
| Plates, Chicago | 4.50 | 4.50 | 4.50 | 4.225 | 3.70 |
| Plates, Coatesville, Pa. | 4.50 | 4.50 | 4.50 | 4.225 | 4.15 |
| Plates, Sparrows Point, Md. | 4.50 | 4.50 | 4.50 | 4.225 | 3.70 |
| Plates, Claymont, Del. | 5.35 | 5.35 | 4.50 | 4.225 | 4.15 |
| Sheets, H.R., Pittsburgh | 4.325 | 4.325 | 4.325 | 4.05 | 3.60-3.75 |
| Sheets, H.R., Chicago | 4.325 | 4.325 | 4.325 | 4.05 | 3.60 |
| Sheets, C.R., Pittsburgh | 5.325 | 5.325 | 5.325 | 4.95 | 4.35 |
| Sheets, C.R., Chicago | 5.325 | 5.325 | 5.325 | 4.95 | 4.35 |
| Sheets, C.R., Detroit | 5.325-5.425 | 5.325-5.425 | 5.325-5.425 | 5.10 | 4.55 |
| Sheets, Galv., Pittsburgh | 5.85 | 5.85 | 5.85 | 5.45 | 4.80 |
| Strip, H.R., Pittsburgh | 4.325 | 4.325 | 4.325 | 4.05 | 3.75-4.00 |
| Strip, H.R., Chicago | 4.325 | 4.325 | 4.325 | 4.05 | 3.50 |
| Strip, C.R., Pittsburgh | 6.25 | 6.25 | 6.25 | 5.75 | 4.65-5.35 |
| Strip, C.R., Chicago | 6.25-6.35 | 6.25-6.35 | 6.25-6.35 | 5.85 | 4.90 |
| Strip, C.R., Detroit | 6.35 | 6.35 | 6.35 | 5.90 | 4.35-5.60 |
| Wire, Basic, Pittsburgh | 6.60 | 6.60 | 6.60 | 5.75 | 4.85-5.10 |
| Nails, Wire, Pittsburgh | 7.60 | 7.60 | 7.60 | 6.85 | 5.90-6.20 |
| Tin plate (1.50 lb), box, Pitts. | $9.85 | $9.85 | $9.45 | $9.05 | $8.70 |

*Including 0.35c for special quality

### SEMIFINISHED STEEL

| | | | | | |
|---|---|---|---|---|---|
| Billets, Forging, Pitts. (NT) | $54.50 | $54.50 | $54.50 | $78.00 | $66.00 |
| Wire rods, $\frac{5}{16}$-$\frac{9}{32}$" Pitts. | 5.375 | 5.375 | 5.375 | 4.675 | 4.10-4.30 |

### PIG IRON, Gross Ton

| | | | | | |
|---|---|---|---|---|---|
| Bessemer, Pitts. | $61.00 | $61.00 | $61.00 | $57.00 | $53.00 |
| Basic Valley | 60.00 | 60.00 | 60.00 | 56.00 | 52.00 |
| Basic, deld. Phila. | 63.76 | 63.76 | 63.76 | 59.66 | 56.49 |
| No. 2 Fdry, Pitts. | 60.50 | 60.50 | 60.50 | 56.50 | 52.50 |
| No. 2 Fdry, Chicago | 60.50 | 60.50 | 60.50 | 56.50 | 52.50 |
| No. 2 Fdry, deld. Phila. | 64.26 | 64.26 | 64.26 | 55.16 | 56.90 |
| No. 2 Fdry, Birm. | 55.00 | 55.00 | 55.00 | 52.88 | 48.88 |
| No. 2 Fdry (Birm.) deld. Cin. | 62.70 | 62.70 | 62.70 | 60.58 | 55.33 |
| Malleable, Valley | 60.50 | 60.50 | 60.50 | 56.50 | 52.50 |
| Malleable, Chicago | 60.50 | 60.50 | 60.50 | 56.50 | 52.50 |
| Ferromanganese, Duquesne | 215.00† | 215.00† | 215.00† | 190.00† | 185.00* |

†74-76% Mn, net ton. *75-82% Mn, gross ton, Etna, Pa.

### SCRAP, Gross Ton (Including broker's commission)

| | | | | | |
|---|---|---|---|---|---|
| No. 1 Heavy Melt, Pitts. | $49.50 | $51.50 | $54.50 | $34.50 | $45.00 |
| No. 1 Heavy Melt, E. Pa. | 54.00 | 56.00 | 56.00 | 36.00 | 43.50 |
| No. 1 Heavy Melt, Chicago | 49.50 | 51.50 | 54.50 | 34.00 | 43.50 |
| No. 1 Heavy Melt, Valley | 53.50 | 57.50 | 60.50 | 34.50 | 45.00 |
| No. 1 Heavy Melt, Cleve. | 49.50 | 54.50 | 57.50 | 31.50 | 44.00 |
| No. 1 Heavy Melt, Buffalo | 53.50 | 53.50 | 55.50 | 30.50 | 44.00 |
| Rails, Rerolling, Chicago | 72.50 | 72.50 | 72.50 | 52.50 | 52.50 |
| No. 1 Cast, Chicago | 52.50 | 52.50 | 51.50 | 40.50 | 49.00 |

### COKE, Net Ton

| | | | | | |
|---|---|---|---|---|---|
| Beehive, Furn, Connisvl. | $14.125 | $14.125 | $14.125 | $13.75 | $14.75 |
| Beehive, Fdry, Connisvl. | 16.50 | 16.50 | 16.50 | 16.75 | 17.50 |
| Oven, Fdry, Chicago | 27.00 | 27.00 | 27.00 | 24.50 | 21.00 |

# Daily Nonferrous Price Record

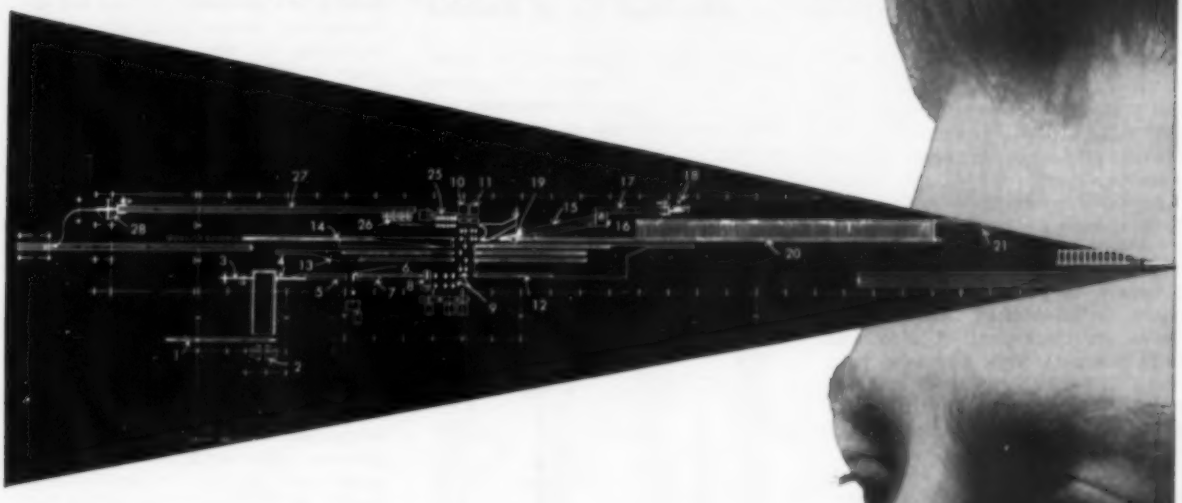
| | May 16 Price | Last Change | Previous Price | Apr. Avg. | Mar. Avg. | May 1955 Avg. |
|---|---|---|---|---|---|---|
| Copper | 45.00-46.00 | May 2, 1956 | 45.50-46.00 | 47.500 | 49.727 | 36.000 |
| Lead | 15.80 | Jan. 13, 1956 | 16.30 | 15.800 | 15.800 | 14.800 |
| Zinc | 13.50 | Jan. 6, 1956 | 13.00 | 13.500 | 13.500 | 12.000 |
| Tin | 97.875 | May 10, 1956 | 97.25 | 99.270 | 100.606 | 91.410 |
| Nickel | 64.50 | Nov. 24, 1954 | 60.00 | 64.500 | 64.500 | 64.500 |
| Aluminum | 25.90 | Mar. 29, 1956 | 24.40-25.90 | 24.650 | 24.650 | 23.200 |
| Magnesium | 33.75 | Apr. 16, 1956 | 32.500 | 33.150 | 32.500 | 28.500 |

Quotations in cents per pound based on: COPPER, deld. Conn. Valley; LEAD, common grade, deld. St. Louis; ZINC, prime western, E. St. Louis; TIN, Straits, deld. New York; NICKEL, electrolytic cathodes, 99.9%, base size at refinery, unpacked; ALUMINUM, primary ingots, 99 + %, deld.; MAGNESIUM, pig, 99.8%, Velasco, Tex.

### What You Can Use the Markets Section for:

- **A source of price information.** Current prices are reported each week. Price changes are shown in italics. Price trends are shown in tables of indexes and comparisons.
- **A directory of producing points.** Want to know who makes something, or where it is made? The steel price tables alphabetically list the cities of production and indicate the producing company. If you are a buyer, you may want to make a map showing comparative distances of sources of supply and to help you compute freight costs. If you are a seller of supplies you can make a map to spot your sales possibilities.
- **A source of price data for making your own comparisons.** Maybe you want to keep a continuous record of price spread between various forms of steel. You can get your base price information from STEEL's price tables.
- **A source of information on market trends.** Newsy items tell you about the supply-demand situation of materials, including iron and steel, nonferrous metals and scrap. Other articles analyze special situations of interest and importance to you.
- **Reports on iron and steel production, and materials and product shipments.**

# Can improved plant layout increase your production capacity?



## the answer may be here...

. . . because BIRDSBORO is more than a producer of mill machines. We're designers and planners . . . combining engineering knowledge with *ideas*. Tough mill problems are constantly being brought to BIRDSBORO for solution, and the answers often lead to tangible increases in productivity, lower costs. Call your BIRDSBORO representative. Ask him to put this proven engineering ability to work for you.

*Designers and Builders of:*
STEEL MILL MACHINERY
HYDRAULIC PRESSES
CRUSHING MACHINERY
SPECIAL MACHINERY
STEEL CASTINGS
Weldments "CAST-WELD" Design
ROLLS: Steel, Alloy Iron, Alloy Steel

*Not just machines— but ideas, too!*

# BIRDSBORO

**BIRDSBORO STEEL FOUNDRY & MACHINE CO.,** Main Offices in Birdsboro, Pa. District Office: Pittsburgh, Pa.

*New York Office:* **Engineering Supervision Co.,** *743 Fifth Ave., New York 22, N.Y.*

# Nonferrous Metals

**"A meeting of aluminum supply and demand will simply make the development of new fields more readily possible," predicts I. W. Wilson, president, Aluminum Co. of America**

Nonferrous Metal Prices, Pages 166 & 167

"OUR CAPITAL expenditures during the next five years could reach the $600-million mark," predicts I. W. Wilson, president, Aluminum Co. of America.

Speaking before the New York Society of Security Analysts (May 15), Mr. Wilson reported that recent price increases on primary aluminum were necessary to get a more favorable return on investment, adding: "Our return on investment in 1955 was 10.14 per cent. This was in a peak year." Alcoa, he explained, feels it should be able to have at least a 10-per-cent profit on investment during normal years, too.

Said Mr. Wilson: "A higher average return is essential if Alcoa, and the industry as a whole, is to be in a position to develop and adequately serve the expanding aluminum market."

**Power**—Mr. Wilson pointed out that Alcoa has three sources of power—water, natural gas and lignite. Its new smelter (150,000 tons), soon to be built near Evansville, Ind., will use coal.

**Potential**—"We believe that U. S. consumption of primary aluminum will increase from about 2 million tons today to some 5 million tons in 1975—from a little over 24 lb per capita to about 45. In the auto industry alone, 35.2 lb of aluminum (average per car) is being used. By 1960, the average will be up to 49.8 lb. Our problem is to keep our production facilities abreast of this market and to gear our research (Alcoa is spending $8.5 million in '56) and development activities ahead of the growing market." Alcoa's planned and installed smelting capacity totals 942,500 tons.

## Titanium: Price Drops

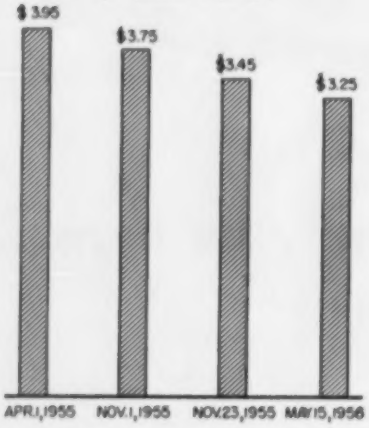
Titanium sponge prices have dropped another 20 cents, to $3.25 per pound. Titanium Metals Corp. of America made the first announcement. In the last 14 months, Titanium Metals has trimmed its price four times.

The price of all mill products has been lowered about 6 per cent. Reductions range from 65 cents to $1 per pound for products such as sheet and strip.

Titanium Metals states that the price drop will apply to its record backlog which extends into the fourth quarter. Price adjustments on existing orders (parts for aircraft, jet engine and guided missile builders) will save manufacturers an estimated $2 million.

Crux: The metal is having a peak production year. As sales pour in, producers are getting better and more economical production results. They are passing these savings along to customers. Each price reduction is generating added interest for nonmilitary applications.

**TITANIUM'S GOAL**
**A More Attractive Price**
(per pound of sponge)




## Nickel Notes

Senatorial interest and primary producers' concern (see page 80) over "short war possibilities" may be forcing the government to reappraise the need for stockpiled nickel. The question being posed in Washington: If a major war is of short duration, will a large stockpile be necessary or useful?

It appears that the Office of Defense Mobilization will announce within the next few weeks that it is ready to give government assistance (fast tax write-offs, guarantees to buy excess production, etc.) to those interested in developing new sources of supply.

## Copper Men Worried

Primary producers are still selling their entire monthly production, but they are not smiling. They feel that the copper market is heading for a quiet period, barring strikes. Reasons: 1. Automotive cutbacks are affecting mill orders. 2. Customers are beginning to "clam up" about how much copper they will need for June. 3. Custom smelters' sales (45 cents a pound) are steady but far from spectacular. 4. The London Metal Exchange quotation continues to hover near 43 cents a pound. One large producer told STEEL: "There could be a lot of excess copper on the market by the end of the third quarter."

## Lead, Zinc Sales Steady

Lead and zinc sales are moderate. They are running ahead of April totals, but there are indications that consumers are still playing a wait-and-see game with producers. Reports one source: "When there is plenty of metal, our customers buy for what seems like a day at a time."

Special high grade zinc continues to be a drug on the market. Zinc people predict that it will be July or August before there will be any marked change in these sales. Lead producers explain that if battery manufacturers follow their historical pattern, they will come into the market for substantial tonnages within the next three or four weeks.

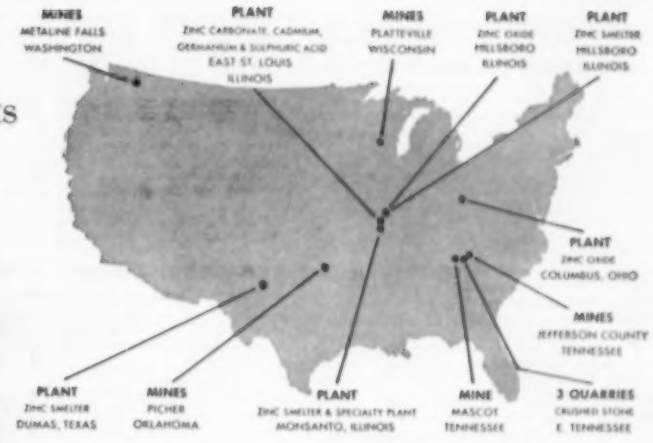
## USI To Produce Titanium

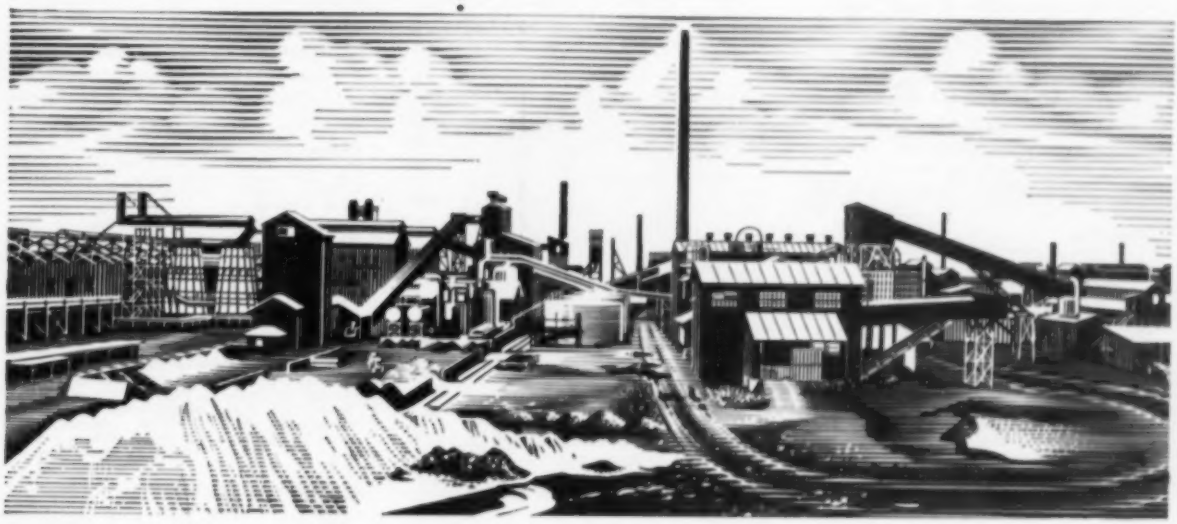
U. S. Industrial Chemicals Co., a division of National Distillers Corp., plans semicommercial production of 500,000 lb of titanium sponge a year at a new plant in Ashtabula, O. Earlier this month (see STEEL, May 14, p. 196) USI announced plans for zirconium facilities, also at Ashtabula. The company will use a smaller plant for zirconium until the larger one is completed. This small plant will be suitable for production of other metals, including titanium-hafnium sponge, thorium or beryllium.

## Market Memo

• St. Joseph Lead Co. reports that it has dropped its plan to enter the aluminum field. It had hoped, with the help of Pittsburgh Consolidation Coal Co., to start a smelting operation. Andrew Fletcher, St. Joe president, reports that the government will not provide tax write-offs and that it is becoming more difficult to find adequate supplies of economically priced alumina.

# American Zinc and its products *from* A *to* Z



**FAIRMONT CITY, ILLINOIS**
**(East St. Louis)**

Operations include: roasting and sintering of zinc concentrates; cadmium plant producing commercial balls, sticks and plates; zinc carbonate plant; germanium plant producing germanium dioxide for the electronics industry. Sulphuric acid is produced by both the Chamber and Contact methods. For complete picture of American Zinc operations, see map above.

**PRODUCERS OF**

ALL GRADES OF SLAB ZINC
ZINC ANODES (Plating & Galvanic)
METALLIC CADMIUM
SULPHURIC ACID
LEAD FREE and LEADED ZINC OXIDES
ZINC CARBONATE
GERMANIUM DIOXIDE
AGRICULTURAL LIMESTONE
CRUSHED STONE

*Distributors for*

**American Zinc sales Company**

AMERICAN ZINC, LEAD & SMELTING COMPANY

*Columbus, Ohio • Chicago • St. Louis • New York • Detroit • Pittsburgh*

# Nonferrous Metals

Cents per pound, carlots, except as otherwise noted

## PRIMARY METALS AND ALLOYS

**Aluminum:** 99 + %, ingots, 25.90; pigs, 24.00, 10,000 lb or more, f.o.b. shipping point. Freight allowed on 500 lb or more.

**Aluminum Alloy:** No. 13, 12% Si, 27.70; No. 43, 5% Si, 27.50; No. 142, 4% Cu, 1.5% Mg, 2% Ni, 29.70; No. 195, 4.5% Cu, 0.8% Si, 29.30; No. 214, 3.8% Mg, 29.30; No. 356, 7% Si, 0.3% Mg, 27.70.

**Antimony:** R.M.M. brand, 99.5%, 33.00; Lone Star brand, 33.50, f.o.b. Laredo, Tex., in bulk. Foreign brands, 99.5%, 27.00-25.00, New York, duty paid, 10,000 lb or more.

**Beryllium:** 97%, lump or beads, $71.50 per lb, f.o.b. Cleveland or Reading, Pa.

**Beryllium Aluminum:** 5% Be, $74.75 per lb of contained Be, f.o.b. Reading, Pa., Elmore, O.

**Beryllium Copper:** 3.75-4.25% Be, $43 per lb of contained Be, with balance as Cu at market price on shipment date, f.o.b. Reading, Pa., or Elmore, O.

**Bismuth:** $2.25 per lb ton lots.

**Cadmium:** Sticks and bars, $1.70 per lb deld.

**Cobalt:** 97-99%, $2.60 per lb for 550-lb keg; $2.62 per lb for 100-lb case; $2.67 per lb under 100 lb.

**Columbium:** Powder, $119.20 per lb, nom.

**Copper:** Electrolytic, 46.00 deld. Conn. Valley; 46.00 deld. Midwest; custom smelter, 45.00 deld.; Lake, 46.00 deld.; Fire refined, 45.75 deld.; Chilean electrolytic, 42.03 deld.

**Germanium:** First reduction, $201.85-$220 per lb; intrinsic grade, $220-$242.67 per lb, depending on quantity.

**Gold:** U. S. Treasury, $35 per oz.

**Indium:** 99.9%, $2.25 per troy oz.

**Iridium:** $100-$110 nom. per troy oz.

**Lead:** Common, 15.80; chemical, 15.90; corroding, 15.90, St. Louis, New York basis, add 0.20.

**Lithium:** 99 +, cups or ingots, $11.50; rod $13.50; shot or wire, $14.50, f.o.b. Minneapolis, 100 lb lots.

**Magnesium:** Pig, 23.75 f.o.b. Velasco, Tex.; ingot, 24.50 f.o.b. Velasco, Tex.

**Magnesium Alloys:** AZ91B (diecasting), 35.00 deld.; AZ63A, AZ92A, AZ91C (sand casting), 29.25 f.o.b. Velasco, Tex.

**Mercury:** Open market, spot, New York, $268-$271 per 76-lb flask.

**Molybdenum:** Powder, 99% hydrogen reduced, $3.20 per lb; pressed ingot, $4.00 per lb; sintered ingot, $5.53 per lb.

**Nickel:** Electrolytic cathodes, sheets (4 x 4 in. and larger), unpacked, 64.50; 10-lb pigs, unpacked, 67.65; "XX" nickel shot, 69.00; "F" nickel shot or ingots for addition to cast iron, 64.50; prices f.o.b. Port Colborne, Ont., including import duty, New York basis, add 0.92.

**Osmium:** $80-$100 per troy oz nom.

**Palladium:** $23-$24 per troy oz.

**Platinum:** $103-$110 per troy oz from refineries.

**Radium:** $16-$21.50 per mg radium content depending on quantity.

**Rhodium:** $115-$125 per troy oz.

**Ruthenium:** $45-$55 per troy oz.

**Selenium:** 99.5%, $13.50-$15.50 per lb.

**Silver:** Open market, 90.75 per troy oz.

**Sodium:** 16.50, c.l.; 17.00 l.c.l.

**Tantalum:** Sheet, rod, $68.70 per lb; powder, $56.63 per lb.

**Tellurium:** $1.50-$1.75 per lb.

**Thallium:** $12.50 per lb.

**Tin:** Straits, N. Y., spot 97.875; prompt, 97.75.

**Titanium:** Sponge, 99.3 + %, grade A-1 ductile (0.3% Fe max), $3.25; grade A-2 (0.5% Fe max), $3.15 per pound.

**Tungsten:** Powder, 98.5%, carbon reduced, 1000-lb lots, $4.50 per lb, nom, f.o.b. shipping point; less than 1000 lb add 15.00; 99 + % hydrogen reduced, $5.00. Treated ingot, $6.70.

**Zinc:** Prime Western, 13.50; brass special, 13.75; intermediate, 14.00, East St. Louis, freight allowed over 0.50 per pound. High grade, 14.35; special high grade, 15.25 deld.

Diecasting alloy ingot No. 3, 18.00; No. 2, 19.00; No. 5, 18.50, deld.

**Zirconium:** Ingots, commercial grade, $14.40 per lb; low-hafnium reactor grade, $23.07. Sponge, commercial grade, $7.50-$10.00 per lb, depending on quantity; reactor grade, $14.00-$22.00 per lb, depending on quantity. Powder, electronics grade, $15 per lb; flash grade, $11.50.

(Note: Chromium, manganese and silicon metals are listed in ferroalloy section.)

## SECONDARY METALS AND ALLOYS

**Aluminum Ingot:** Piston alloys, 26.00-28.75; No. 13 foundry alloy (No. 2 grade), 24.75-25.25; 5% silicon alloy, 0.60 Cu max, 24.25-26.50; 13 alloy, 0.60 Cu max, 26.25-26.50; 195 alloy, 26.75-27.00; 108 alloy, 25.00-25.25. Steel deoxidizing grades, notch bars, granulated or shot: Grade 1, 26.00-27.00; grade 2, 24.25-26.25; grade 3, 23.50-25.50; grade 4, 23.00-24.50.

**Brass Ingot:** Red brass, No. 115, 40.50; tin bronze, No. 225, 53.50; No. 245, 46.75; high-leaded tin bronze, No. 305, 43.75; No. 1 yellow, No. 406, 31.75; manganese bronze, No. 421, 34.25.

**Magnesium Alloy Ingot:** AZ63A, 36.00; AZ91B, 36.00; AZ91C, 36.00; AZ92A, 36.00.

## NONFERROUS MILL PRODUCTS

### BERYLLIUM COPPER

(Base prices per lb, plus mill extras, 2000 to 5000 lb, f.o.b. Temple, Pa.; nominal 1.9% Be alloy) Strip, $1.92; rod, bar, wire, $1.89.

### COPPER WIRE

Bare, soft, f.o.b. eastern mills, 30,000 lb lots, 51.355; l.c.l., 51.98. Weatherproof, 30,000-lb lots, 48.28; l.c.l., 49.03. Magnet wire deld., 15,000 lb or more, 58.68; l.c.l., 59.43.

### LEAD

(Prices to jobbers, f.o.b. Buffalo, Cleveland, Pittsburgh) Sheets, full rolls, 140 sq ft or more, $21.50 per cwt; pipe, full coils, $21.50 per cwt; traps and bends, list prices plus 30%.

### TITANIUM

(Prices per lb, 10,000 lb and over, f.o.b. mill) Sheets, $12.60-$13.10; sheared mill plate, $10.00-$12.00; strip, $12.10-$12.60; wire, $9.00-$11.50; forging billets, $7.25-$7.50; hot-rolled and forged bars, $7.55-$7.80.

### ZINC

(Prices per lb, c.l., f.o.b. mill) Sheets, 24.00; ribbon zinc in coils, 21.50; plates, 29.00.

### ZIRCONIUM

Plate, $22; H.R. strip, $19; C.R. strip, $29; forged or H.R. bars, $17; wire, 0.015 in., 1.00s per linear foot.

### NICKEL, MONEL, INCONEL

| | "A" Nickel | Monel | Inconel |
|---|---|---|---|
| Sheets, C.R. | 102 | 83 | 99 |
| Strip, C.R. | 102 | 92 | 125 |
| Plate, H.R. | 97 | 87 | 95 |
| Rod, Shapes, H.R. | 87 | 74 | 93 |
| Seamless Tubes | 122 | 110 | 153 |

### ALUMINUM

**Screw Machine Stock:** 30,000 lb base.

| Diam. (in.) or across flats | Round 2011-T3 | Round 2017-T4 | Hexagonal 2011-T3 | Hexagonal 2017-T4 |
|---|---|---|---|---|
| **Drawn** | | | | |
| 0.125 | 60.4 | 67.9 | ... | ... |
| 0.156-0.172 | 59.0 | 57.4 | ... | ... |
| 0.188 | 59.0 | 57.4 | ... | 73.2 |
| 0.219-0.234 | 56.0 | 54.4 | ... | ... |
| 0.250-0.281 | 56.0 | 54.4 | ... | 69.9 |
| 0.313 | 56.0 | 54.4 | ... | 66.7 |
| **Cold-finished** | | | | |
| 0.375-0.547 | 54.9 | 52.9 | 65.2 | 62.8 |
| 0.563-0.688 | 54.9 | 52.9 | 62.1 | 59.0 |
| 0.750-1.000 | 53.6 | 51.6 | 58.9 | 55.7 |
| 1.063 | 53.6 | 51.6 | ... | 53.8 |
| 1.125-1.500 | 51.6 | 49.7 | 55.1 | 53.8 |
| **Rolled** | | | | |
| 1.563 | 50.3 | 48.4 | ... | ... |
| 1.625-2.000 | 49.7 | 47.7 | ... | 52.0 |
| 2.125-2.500 | 48.5 | 46.8 | ... | ... |
| 2.563-3.375 | 47.1 | 45.1 | ... | ... |

### ALUMINUM

**Sheet and Circle:** 1100 and 3003 mill finish (30,000 lb base; freight allowed)

| Thickness Range Inches | Flat Sheet | Flat Sheet Circles* | Coiled Sheet | Coiled Sheet Circles† |
|---|---|---|---|---|
| 0.249-0.136 | 39.0 | 43.8 | ... | ... |
| 0.135-0.096 | 39.5 | 44.7 | 37.5 | 42.4 |
| 0.095-0.077 | 40.2 | 45.7 | 37.6 | 42.8 |
| 0.076-0.061 | 40.8 | 46.6 | 37.8 | 43.0 |
| 0.060-0.048 | 41.4 | 47.1 | 38.2 | 43.5 |
| 0.047-0.038 | 41.9 | 48.0 | 38.7 | 43.9 |
| 0.037-0.030 | 42.3 | 48.5 | 39.1 | 44.4 |
| 0.029-0.024 | 42.9 | 49.0 | 39.4 | 45.1 |
| 0.023-0.019 | 43.7 | 50.5 | 40.3 | 46.0 |
| 0.018-0.017 | 44.5 | ... | 40.9 | 46.9 |
| 0.016-0.015 | 45.4 | ... | 41.7 | 48.1 |
| 0.014 | 46.4 | ... | 42.7 | 49.4 |
| 0.013-0.012 | 47.6 | ... | 43.4 | 50.4 |
| 0.011 | 48.6 | ... | 44.6 | 52.0 |
| 0.010-0.0095 | 49.9 | ... | 45.8 | 53.7 |
| 0.009-0.0085 | 51.2 | ... | 47.3 | 55.8 |
| 0.008-0.0075 | 52.8 | ... | 48.5 | 57.6 |
| 0.007 | 54.3 | ... | 50.0 | 59.9 |
| 0.006 | 55.9 | ... | 51.4 | 64.9 |

*48 in. max diam. †26 in. max diam.

### ALUMINUM

**Plates and Circles:** Thickness 0.250-3 in., 24-60 in. width or diam, 72-240 in. lengths

| Alloy | Plate Base | Circle Base |
|---|---|---|
| 1100-F, 3003-F | 38.0 | 42.3 |
| 5050-F | 39.1 | 43.4 |
| 3004-F | 40.1 | 45.3 |
| 5052-F | 41.4 | 46.7 |
| 6061-T6 | 42.6 | 47.5 |
| 2024-T4* | 45.1 | 51.4 |
| 7075-T6* | 52.9 | 60.0 |

*24-48 in. widths or diam, 72-180 lengths

### ALUMINUM

**Forging Stock:** Round, Class 1, 40.60-51.60 in specific lengths 36-144 in. diameters 0.375-8 in. Rectangles and squares, Class 1, 44.50-57.70 in random lengths, 0.375-4 in. thick, width 0.750-10 in.

**Pipe:** ASA schedule 40, alloy 6063-T6, 20-ft length, plain ends, 90,000-lb base, per 100 ft.

| Nom. Pipe Size (in.) | | Nom. Pipe Size (in.) | |
|---|---|---|---|
| ⅜ | $17.45 | 2 | $ 53.85 |
| 1 | 27.35 | 4 | 148.60 |
| 1¼ | 37.05 | 6 | 268.55 |
| 1½ | 44.30 | 8 | 401.10 |

### MAGNESIUM

**Sheet and Plate:** AZ31A standard grade, .032 in., 100.00; .081 in., 75.00; .188 in., 66.50, .250-2.0 in., 65.60. AZ31A special grade, .032 in., 163.10; .081 in., 103.50; .188 in., 91.10, .250-2.0, 88.90. Treat plate, .188 in., 68.90, .250-2.0 in., 67.80. Tooling plate, .250-3.0 in., 70.20.

**Extruded Solid Shapes:**

| Factor | Com. Grade (FS) | Spec. Grade (AZ31B) |
|---|---|---|
| 6-8 | 56.40-59.00 | 81.40-84.00 |
| 12-14 | 67.50-69.60 | 82.50-84.60 |
| 24-26 | 72.10-72.70 | 87.10-87.70 |
| 36-38 | 84.90-85.80 | 99.90-100.80 |

## NONFERROUS SCRAP

### DEALERS BUYING PRICES

(Cents per pound, New York, in ton lots)

**Aluminum:** 1100 clippings, 17.50-18.00; old sheets, 14.00-14.50; borings and turnings 9.00-9.50; crankcases, 14.00-14.50; industrial castings, 14.00-14.50.

**Copper and Brass:** No. 1 heavy copper and wire, 34.00-34.50; No. 2 heavy copper and wire 32.00-32.50; light copper, 29.50-30.00; No. 1 composition red brass, 27.50-28.00; No. 1 composition turnings, 27.00-27.50; yellow brass

## BRASS MILL PRICES

| | MILL PRODUCTS a | | | | SCRAP ALLOWANCES f | | |
|---|---|---|---|---|---|---|---|
| | Sheet, Strip, Plate | Rod | Wire | Seamless Tube | Clean Heavy | Rod Ends | Clean Turnings |
| Copper | 67.11b | 64.36c | .... | 67.32 | 42.000 | 42.000 | 41.250 |
| Yellow Brass | 55.60 | 45.65d | 56.14 | 58.51 | 31.250 | 31.000 | 29.000 |
| Low Brass, 80% | 60.15 | 60.09 | 60.69 | 62.96 | 35.375 | 35.125 | 34.625 |
| Red Brass, 85% | 61.79 | 61.73 | 62.33 | 64.69 | 37.000 | 36.750 | 36.250 |
| Com. Bronze, 90% | 63.96 | 63.92 | 64.52 | 66.54 | 38.500 | 38.250 | 37.750 |
| Manganese Bronze | 62.63 | 56.76 | 67.60 | .... | 28.875 | 28.625 | 28.125 |
| Muntz Metal | 56.94 | 52.75 | .... | .... | 29.125 | 28.875 | 28.375 |
| Naval Brass | 58.84 | 53.15 | 65.90 | 62.06 | 28.875 | 28.625 | 28.125 |
| Silicon Bronze | 70.48 | 69.67 | 70.52 | 75.59e | 40.750 | 40.500 | 39.750 |
| Nickel Silver, 10% | 70.16 | 72.49g | 72.49 | .... | 35.625 | 35.375 | 17.813 |
| Phos. Bronze, A, 5% | 84.92 | 85.42 | 85.42 | 84.60 | 42.125 | 41.875 | 40.875 |

a. Cents per lb, f.o.b. mill; freight allowed on 500 lb or more. b. Hot-rolled. c. Cold-drawn. d. Free cutting. e. 3% silicon. f. Prices in cents per lb for less than 20,000 lb, f.o.b. shipping point. On lots over 20,000 lb at one time, of any or all kinds of scrap, add 1 cent per lb. g. Leaded

turnings, 17.00-18.00; new brass clippings, 24.50-25.00; light brass, 16.50; heavy yellow brass, 19.00; new brass rod ends, 23.50-24.00; auto radiators, unsweated, 19.00-19.50; cocks and faucets, 22.00; brass pipe, 21.50.

**Lead:** Heavy, 12.50-12.75; battery plates, 6.50-6.75; linotype and stereotype, 14.00-14.50; electrotype, 13.25-13.75; mixed babbitt, 15.50.

**Monel:** Clippings, 65.00-90.00; old sheets, 65.00-80.00; turnings 65.00-70.00; rods, 65.00-90.00.

**Nickel:** Sheets and clips, 100.00-200.00; rolled anodes, 100.00-200.00; turnings, 85.00-185.00; rod ends, 100.00-200.00.

**Zinc:** Old zinc, 5.50-6.00; new die-cast scrap, 5.50; old die-cast scrap, 3.00.

### REFINER'S BUYING PRICES

(Cents per pound, carlots, delivered refinery)

**Aluminum:** 1100 clippings, 17.50-18.75; 3003 clippings, 17.50-18.50; 6151 clippings, 17.50-18.50; 5052 clippings, 17.50-18.50; 2014 clippings, 17.00-18.50; 2017 clippings, 17.00-18.50; 2024 clippings, 17.00-18.50; mixed clippings, 17.00-18.00; old sheet, 15.50-16.50; old cast, 15.50-16.50; clean old cable (free of steel), 15.50-18.25; borings and turnings, 16.00-17.00.

**Beryllium Copper:** Heavy scrap, 0.020-in. and heavier, not less than 1.5% Be, 68.00; light scrap, 63.00; turnings and borings, 48.00.

**Copper and Brass:** No. 1 heavy copper and wire, 37.50; No. 2 heavy copper and wire, 36.00; light copper, 33.50; refinery brass (60% copper) per dry copper content, 34.00.

### INGOTMAKERS' BUYING PRICES

(Cents per pound, carlots, delivered)

**Copper and Brass:** No. 1 heavy copper and wire, 37.50; No. 2 heavy copper and wire, 36.00; light copper, 33.50; No. 1 composition borings, 30.00-30.50; No. 1 composition solids, 30.50-31.00; heavy yellow brass solids, 20.50-21.00; yellow brass turnings, 20.00; radiators, 23.00-23.50.

### PLATING MATERIAL

(F.o.b. shipping point, freight allowed on quantities)

### ANODES

**Cadmium:** Special or patented shapes, $1.70 per lb.

**Copper:** Flat-rolled, 63.79; oval, 62.92, 5000-10,000 lb; electrodeposited, 61.25, 2000-5000 lb lots; cast 58.85, 5000-10,000 lb quantities.

**Nickel:** Depolarized, less than 100 lb, $1.015; 100-499 lb, 99.50; 500-4999 lb, 95.50; 5000-29,999 lb, 93.50; 30,000 lb, 91.50. Carbonized, deduct 2 cents a lb. All prices eastern delivery, effective Jan. 1, 1955.

**Tin:** Bar or slab, less than 200 lb, $1.155; 200-499 lb, $1.140; 500-999 lb, $1.135; 1000 lb or more, $1.130.

**Zinc:** Balls, 21.00; flat tops, 21.00; flats, 22.75; ovals, 22.00, ton lots.

### CHEMICALS

**Cadmium Oxide:** $2.15 per lb, in 100-lb drums.

**Chromic Acid:** Less than 10,000 lb, 28.50; over 10,000 lb, 27.50.

**Copper Cyanide:** 100 lb, 85.25; 200 lb, 84.50; 300 lb, 84.25; 400-900 lb, 83.50; 1000 lb, 81.50.

**Copper Sulphate:** 500-1900 lb, 17.90; 2000-5900 lb, 15.90; 6000 lb or more, 15.65.

**Nickel Chloride:** 100 lb, 46.50; 200 lb, 44.50; 300 lb, 43.50; 400-4900 lb, 41.50; 5000-9900 lb, 39.50; 10,000 lb and over, 38.50. All prices eastern delivery, effective Jan. 1, 1955.

**Nickel Sulphate:** 100 lb, 38.25; 200 lb, 36.25; 300 lb, 35.25; 400-4900 lb, 33.25; 5000-35,900 lb, 31.25; 36,000 lb, 30.35. All prices eastern delivery, effective Jan. 1, 1955.

**Silver Cyanide:** (Cents per ounce) 4-oz bottle, 86.875; 15-oz bottle, 85.625; 80-oz bottle, 83.125; 100-oz bottle, 83.125; f.o.b. St. Louis, New York and Los Angeles. Effective Sept. 30, 1955.

**Sodium Cyanide:** Egg, under 1000 lb, 19.50; 1000-19,900 lb, 18.50; 20,000 lb, and over, 17.80; granular, add 1-cent premium to above.

**Sodium Stannate:** Less than 100 lb, 65.90; 100-600 lb, 61.60; 700-1900 lb, 59.10; 2000-9900 lb, 57.40; 10,000 lb or more, 56.20.

**Stannous Chloride (anhydrous):** Less than 25 lb, $1.605; 25 lb, $1.315; 100 lb, $1.165; 400 lb, $1.141; 5200-19,600 lb, $1.019; 20,000 lb or more, $0.79.

**Stannous Sulphate:** Less than 50 lb, $1.293; 50 lb, 99.30; 100-1900 lb, 97.30; 2000 lb or more, 95.30.

**Zinc Cyanide:** Under 1000 lb, 84.30; 1000 lb and over, 82.30.




# JOLIET WASHERS

Matching industry growth, Joliet has expanded its own facilities—providing the reserve capacity and the flexibility required to meet both regular and emergency *immediate shipment* requirements of its customers. Joliet remains the world's foremost producers of washers—standard and special, any metal, any size, any quantity.

JOLIET WROUGHT WASHER COMPANY • Joliet, Illinois

## No. 1 Source with No. 1 Plants

Write for catalog listing standard washer shapes and sizes. Special washers, too.

# Steel Prices

Mill prices as reported to STEEL, cents per pound except as otherwise noted. *Changes shown in italics.* Code numbers following mill points indicate producing company. Key to producers, page 169; to footnotes, page 171.

## SEMIFINISHED

**INGOTS, Carbon, Forging (NT)**
Munhall,Pa. U5 .....$65.50

**INGOTS, Alloy (NT)**
Detroit R7 .....$69.00
Houston 85 .....74.00
Midland,Pa. C18 .....69.00
Munhall,Pa. U5 .....69.00

**BILLETS, BLOOMS & SLABS**
**Carbon, Rerolling (NT)**
Aliquippa,Pa. J5 .....$66.50
Bessemer,Pa. U5 .....68.50
Bridgeport,Conn. N19 ..73.50
Buffalo R2 .....68.50
Clairton,Pa. U5 .....68.50
Ensley,Ala. T2 .....68.50
Fairfield,Ala. T2 .....68.50
Fontana,Calif. K1 ....78.00
Gary,Ind. U5 .....68.50
Johnstown,Pa. B2 .....68.50
Lackawanna,N.Y. B2 ..68.50
LoneStar,Tex. L6 .....74.50
Munhall,Pa. U5 .....68.50
Pittsburgh J5 .....68.50
S.Chicago,Ill. R2, U5 ..68.50
S.Duquesne,Pa. U5 ....68.50
Youngstown R2 .....68.50

**Carbon, Forging (NT)**
Aliquippa,Pa. J5 .....$84.50
Bessemer,Pa. U5 .....84.50
Bridgeport,Conn. N19 ..89.50
Buffalo R2 .....84.50
Canton,O. R2 .....86.50
Clairton,Pa. U5 .....84.50
Conshohocken,Pa. A3 ..89.50
Ensley,Ala. T2 .....84.50
Fairfield,Ala. T2 .....84.50
Fontana,Calif. K1 ....94.00
Gary,Ind. U5 .....84.50
Geneva,Utah C11 .....84.50
Houston 85 .....101.00
Johnstown,Pa. B2 .....84.50
Lackawanna,N.Y. B2..84.50
LosAngeles B3 .....94.00
Midland,Pa. C18 .....84.50
Munhall,Pa. U5 .....84.50
Pittsburgh J5 .....84.50
Seattle B3 .....98.00
S.Chicago R2,U5,W14 ..84.50
S.Duquesne,Pa. U5 ....84.50
S.SanFrancisco B3 ....94.00

**Alloy, Forging (NT)**
Bethlehem,Pa. B2 ....$96.00
Buffalo R2 .....96.00
Canton,O. R2, T7 .....96.00
Conshohocken,Pa. A3 ..103.00
Detroit R7 .....96.00
Fontana,Calif. K1 ....117.00
Gary,Ind. U5 .....96.00
Houston 85 .....105.00
Ind.Harbor,Ind. Y1 ....96.00
Johnstown,Pa. B2 ....96.00
Lackawanna,N.Y. B2 ..96.00
LosAngeles B3 .....116.00
Massillon,O. R2 .....96.00
Midland,Pa. C18 .....96.00
Munhall,Pa. U5 .....96.00
S.Chicago R2,U5,W14 ..96.00
S.Duquesne,Pa. U5 ....96.00
Struthers,O. Y1 .....96.00
Warren,O. C17 .....96.00

**ROUNDS, SEAMLESS TUBE (NT)**
Buffalo R2 .....$103.50
Canton,O. R2 .....103.50
Cleveland R2 .....103.50
Gary,Ind. U5 .....103.50
S.Chicago R2, W14 ...103.50
S.Duquesne,Pa. U5 ...103.50

**SKELP**
Aliquippa,Pa. J5 .....4.325
LoneStar,Tex. L6 .....4.425
Munhall,Pa. U5 .....4.325
SparrowsPoint,Md. B2..4.225
Warren,O. R2 .....4.225
Youngstown R2, U5 ...4.225

**WIRE RODS**
AlabamaCity,Ala. R2 ..5.375
Aliquippa,Pa. J5 .....5.375
Alton,Ill. L1 .....5.55
Buffalo W12 .....5.375
Cleveland A7 .....5.375
Donora,Pa. A7 .....5.375
Fairfield,Ala. T2 .....5.375
Houston 85 .....5.625
IndianaHarbor,Ind. Y1..5.375
Johnstown,Pa. B2 ....5.375
Joliet,Ill. A7 .....5.375
KansasCity,Mo. S5 ....5.625
Kokomo,Ind. C16 .....5.475
Los Angeles B3 .....6.175
Minnequa,Colo. C10 ...5.625
Monessen,Pa. P7 .....5.375
N.Tonawanda,N.Y. B11 5.375
Pittsburg,Calif. C11 ...6.025
Portsmouth O. P12 ....5.375
Roebling,N.J. R5 .....5.475
S.Chicago,Ill. R2 .....5.375
SparrowsPoint,Md. B2..5.475
Sterling,Ill.(1) N15 ....5.375
Sterling,Ill. N15 .....5.475
Struthers,O. Y1 .....5.375
Worcester,Mass. A7 ...5.675

## STRUCTURALS

**Carbon Steel Std. Shapes**
Ala.City,Ala. R2 .....4.60
Aliquippa,Pa. J5 .....4.60
Bessemer,Ala. T2 .....4.60
Bethlehem,Pa. B2 .....4.65
Birmingham C15 .....5.10
Clairton,Pa. U5 .....4.60
Fairfield,Ala. T2 .....4.60
Fontana,Calif. K1 ....5.30
Gary,Ind. U5 .....4.60
Geneva,Utah C11 .....4.60
Houston 85 .....4.70
Ind.Harbor,Ind. I-2 ....4.66
Johnstown,Pa. B2 .....4.65
KansasCity,Mo. S5 ....4.70
Lackawanna,N.Y. B2 ..4.65
LosAngeles B3 .....5.30
Minnequa,Colo. C10 ....4.90
Munhall,Pa. U5 .....4.60
Niles,Calif. P1 .....5.25
Phoenixville,Pa. P4 ....5.15
Portland,Oreg. O4 .....5.35
Seattle B3 .....5.35
S.Chicago U5, W14 .....4.60
S.SanFrancisco B3 ....5.25
Torrance,Calif. C11 ....5.30
Weirton,W.Va. W6 .....4.60

**Wide Flange**
Bethlehem,Pa. B2 .....4.65
Clairton,Pa. U5 .....4.60
Fontana,Calif. K1 ....5.45
Lackawanna,N.Y. B2 ..4.65
Munhall,Pa. U5 .....4.60
Phoenixville,Pa. P4 ....5.15
S.Chicago,Ill. U5 .....4.60

**Alloy Std. Shapes**
Clairton,Pa. U5 .....5.65
Fontana,Calif. K1 ....7.40
Gary,Ind. U5 .....5.65
Houston 85 .....5.75
Munhall,Pa. U5 .....5.65
S.Chicago,Ill. U5 .....5.65

**H.S., L.A. Std. Shapes**
Aliquippa,Pa. J5 .....6.75
Bessemer,Ala. T2 .....6.75
Bethlehem,Pa. B2 .....6.80
Clairton,Pa. U5 .....6.75
Fairfield,Ala. T2 .....6.75
Fontana,Calif. K1 ....7.45
Gary,Ind. U5 .....6.75
Geneva,Utah C11 .....6.75
Houston 85 .....6.85
Ind.Harbor,Ind. I-2, Y1..6.75
Johnstown,Pa. B2 .....6.80
KansasCity,Mo. S5 ....6.85
Lackawanna,N.Y. B2 ..6.80
LosAngeles B3 .....7.45
Munhall,Pa. U5 .....6.75
Seattle B3 .....7.50
S.Chicago,Ill. U5, W14..6.75
S.SanFrancisco B3 ....7.40
Struthers,O. Y1 .....6.75

**H.S., L.A. Wide Flange**
Bethlehem,Pa. B2 .....6.80
Lackawanna,N.Y. B2 ..6.80
Munhall,Pa. U5 .....6.75
S.Chicago,Ill. U5 .....6.75

## PILING

**BEARING PILES**
Bethlehem,Pa. B2 .....4.65
Lackawanna,N.Y. B2 ...4.65
Munhall,Pa. U5 .....4.60
S.Chicago,Ill. U5 .....4.60

**STEEL SHEET PILING**
Ind.Harbor,Ind. I-2 ....5.45
Lackawanna,N.Y. B2 ...5.45
Munhall,Pa. U5 .....5.45
S.Chicago,Ill. U5 .....5.45

## PLATES

**PLATES, Carbon Steel**
Ala.City,Ala. R2 .....4.50
Aliquippa,Pa. J5 .....4.50
Ashland,Ky.(15) A10 ..4.50
Bessemer,Ala. T2 .....4.50
Bridgeport,Conn. N19 ..4.75
Buffalo R2 .....4.50
Clairton,Pa. U5 .....4.50
Claymont,Del. C22 .....5.35
Cleveland J5, R2 .....4.60
Coatesville,Pa. L7 .....4.80
Conshohocken,Pa. A3 ...4.50
Detroit M1 .....4.60
Ecorse,Mich. G5 .....4.60
Fairfield,Ala. T2 .....4.50
Fontana,Calif.(30) K1 ..5.20
Gary,Ind. U5 .....4.50
Geneva,Utah C11 .....4.50
GraniteCity,Ill. G4 .....4.70
Harrisburg,Pa. P4 .....5.10
Houston 85 .....4.60
Ind.Harbor,Ind. I-2, Y1..4.50
Johnstown,Pa. B2 .....4.50
Lackawanna,N.Y. B2 ...4.50
Lonestar,Tex. L6 .....4.85
Mansfield,O. E6 .....4.50
Minnequa,Colo. C10 ....5.35
Munhall,Pa. U5 .....4.50
Newport,Ky. N9 .....4.50
Pittsburgh J5 .....4.50
Riverdale,Ill. A1 .....4.725
Seattle B3 .....5.40
Sharon,Pa. S3 .....4.50
S.Chicago R2, U5, W14..4.50
SparrowsPoint,Md. B2 ..4.50
Steubenville,O. W10 ....4.50
Warren,O. R2 .....4.50
Weirton,W.Va. W6 .....4.50
Youngstown R2, U5, Y1..4.50

**PLATES, Carbon Abras. Resist.**
Claymont,Del. C22 .....6.20
Fontana,Calif. K1 .....6.35
Geneva,Utah C11 .....5.65
Johnstown,Pa. B2 .....5.65
SparrowsPoint,Md. B2 ..5.65

**PLATES, Wrought Iron**
Economy,Pa. B14 .....10.40

**PLATES, High Strength Low-Alloy**
Aliquippa,Pa. J5 .....6.725
Bessemer,Ala. T2 .....6.725
Clairton,Pa. U5 .....6.725
Cleveland J5, R2 .....6.725
Claymont,Del. C22 .....6.725
Coatesville,Pa. L7 .....7.025
Conshohocken,Pa. A3 ..6.725
Ecorse,Mich. G5 .....6.825
Fairfield,Ala. T2 .....6.725
Fontana,Calif.(30) K1..7.425
Gary,Ind. U5 .....6.725
Geneva,Utah C11 .....6.725
Houston 85 .....6.825
Ind.Harbor,Ind. I-2, Y1..6.725
Johnstown,Pa. B2 .....6.725
Munhall,Pa. U5 .....6.725
Pittsburgh J5 .....6.725
Seattle B3 .....7.625
Sharon,Pa. S3 .....6.725
S.Chicago,Ill. U5, W14..6.725
SparrowsPoint,Md. B2..6.725
Warren,O. R2 .....6.725
Youngstown U5, Y1 ...6.725

**PLATES, Alloy**
Bridgeport,Conn. N19 ...6.55
Claymont,Del. C22 .....6.30
Coatesville,Pa. L7 .....6.30
Fontana,Calif. K1 .....7.00
Gary,Ind. U5 .....6.30
Houston 85 .....6.40
Ind.Harbor,Ind. Y1 ....6.30
Johnstown,Pa. B2 .....6.30
Munhall,Pa. U5 .....6.30
Newport,Ky. N9 .....6.30
Seattle B3 .....7.20
Sharon,Pa. S3 .....6.30
S.Chicago,Ill. U5, W14..6.30
SparrowsPoint,Md. B2..6.30
Youngstown Y1 .....6.30

**FLOOR PLATES**
Cleveland J5 .....5.575
Conshohocken,Pa. A3 ..5.575
Harrisburg,Pa. P4 ....5.575
Ind.Harbor,Ind. I-2 ...5.575
Munhall,Pa. U5 .....5.575
S.Chicago,Ill. U5 .....5.575

**PLATES, Ingot Iron**
Ashland c.l. (15) A10...4.75
Ashland,l.c.l. (15) A10..5.25
Cleveland c.l. R2 .....5.10
Warren,O. c.l. R2 .....5.10

## BARS

**BARS, Hot-Rolled Carbon (Merchant Quality)**
Ala.City,Ala.(9) R2 ....4.65
Aliquippa,Pa.(9) J5 ....4.65
Alton Ill. L1 .....4.85
*Atlanta(9) A11 .....5.15*
Bessemer,Ala.(9) T2 ....4.65
Birmingham C15 .....5.15
Bridgeport,Conn. N19 ..4.80
Buffalo(9) R2 .....4.65
Canton,O.(9) R2 .....4.75
Clairton,Pa.(9) U5 .....4.65
Cleveland(9) R2 .....4.65
Ecorse,Mich.(9) G5 ....4.75
Emeryville,Calif. J7 ....5.40
Fairfield,Ala.(9) T2 ....4.65
Fairless,Pa.(9) U5 .....4.80
Fontana,Calif. K1 .....5.35
Gary,Ind.(9) U5 .....4.65
Houston(9) S5 .....4.90
Ind.Harbor,Ind.(9) I-2..4.65
Ind.Harbor,Ind. Y1 .....4.65
Johnstown,Pa.(9) B2 ...4.65
Joliet,Ill. P22 .....5.15
KansasCity,Mo.(9) S5 ..4.90
Lackawanna(9) B2 .....4.65
LosAngeles(9) B3 .....5.35
Massillon,O.(9) R2 .....4.75
Midland,Pa.(9) C18 ....4.65
Milton,Pa. M18 .....4.80
Minnequa,Colo. C10 ....5.10
Niles,Calif. P1 .....5.35
N.T'wanda,N.Y.(9) B11 4.65
Pittsburg,Calif.(9) C11..5.35
Pittsburgh(9) J5 .....4.65
Portland,Oreg. O4 .....5.40
Seattle B3 N14 .....5.40
S.Chicago W14 .....4.65
S.Chicago,Ill.(9) R2, U5 4.65
S.Duquesne,Pa.(9) U5 ..4.65
S.SanFran.,Calif.(9) B3..5.40
Sterling,Ill.(1) N15 ....4.65
Sterling,Ill. N15 .....4.75
Struthers,O Y1 .....4.65
Torrance,Calif.(9) C11..5.35
Warren,O.(9) R2 .....4.65
Weirton,W.Va.(9) W6 ..4.65
Youngstown(9) R2, U5..4.65

**BARS, H.R. Leaded Alloy**
Warren,O. C17 .....6.575

**BARS, Hot-Rolled Alloy**
Bethlehem,Pa. B2 .....5.575
Bridgeport,Conn. N19 ..5.725
Buffalo R2 .....5.575
Canton,O. R2, T7 .....5.575
Clairton,Pa. U5 .....5.575
Detroit R7 .....5.575
Ecorse,Mich. G5 .....5.675
Fairless,Pa. U5 .....5.725
Fontana,Calif. K1 ....6.625
Gary,Ind. U5 .....5.575
Houston 85 .....5.825
Ind.Harbor,Ind. I-2, Y1..5.575
Johnstown,Pa. B2 .....5.575
KansasCity,Mo. S5 ....5.825
Lackawanna,N.Y. B2 ..5.575
LosAngeles B3 .....6.625
Massillon,O. R2 .....5.575
Midland,Pa. C18 .....5.575
S.Chicago R2, U5, W14..5.575
S.Duquesne,Pa. U5 ....5.575
Struthers,O. Y1 .....5.575
Warren,O. C17 .....5.575
Youngstown U5 .....5.575

**BARS & SMALL SHAPES, H.R. High-Strength Low-Alloy**
Aliquippa,Pa. J5 .....6.80
Bessemer,Ala. T2 .....6.80
Bethlehem,Pa. B2 .....6.80
Clairton,Pa. U5 .....6.80
Cleveland R2 .....6.80
Ecorse,Mich. G5 .....6.90
Fairfield,Ala. T2 .....6.80
Fontana,Calif. K1 .....7.50
Gary,Ind. U5 .....6.80
Houston 85 .....7.05
Ind.Harb.,Ind. I-2, Y1..6.80
Johnstown,Pa. B2 .....6.80
KansasCity,Mo. S5 .....7.05
Lackawanna,N.Y. B2 ...6.80
LosAngeles B3 .....7.50
Pittsburgh J5 .....6.80
Seattle B3 .....7.55
S.Chicago W14 .....6.80
S.Duquesne,Pa. U5 ....6.80
S.SanFrancisco B3 .....7.55
Struthers,O. Y1 .....6.80
Warren,O. R2 .....6.80
Youngstown U5 .....6.80

**BAR SIZE ANGLES; H.R. Carbon**
Bethlehem,Pa.(9) B2 ...4.80
Lackawanna(9) B2 .....4.65

**BAR SIZE ANGLES; S. Shapes**
Aliquippa,Pa. J5 .....4.65
*Atlanta A11 .....5.15*
Fontana,Calif. K1 .....5.35
Joliet,Ill. P22 .....5.10
Niles Calif. P1 .....5.35
Pittsburgh J5 .....4.65
Portland,Oreg. O4 .....5.40
S.SanFrancisco S7 .....5.05

**BAR SHAPES, Hot-Rolled Alloy**
Clairton,Pa. U5 .....5.65
Gary,Ind. U5 .....5.65
Houston 85 .....5.90
KansasCity,Mo. S5 .....5.90
Youngstown U5 .....5.65

**BARS, C.F. Loaded Alloy**
Ambridge,Pa. W18 ....8.325
Camden,N.J. F13 .....8.35
Chicago W18 .....8.325
Cleveland C20 .....8.325
Monaca,Pa. S17 .....8.325
Newark,N.J. W18 .....8.50
SpringCity,Pa. K3 .....8.30
Warren,O. C17 .....8.575

**BARS, Cold-Finished Carbon**
Ambridge,Pa. W18 .....6.25
BeaverFalls,Pa. M12,R2 6.25
Buffalo B5 .....6.30
Camden,N.J. P13 .....6.70
Carnegie,Pa. C12 .....6.25
Chicago W18 .....6.25
Cleveland A7, C20 .....6.25
Detroit B5, P17 .....6.45
Detroit R7 .....6.25
Donora,Pa. A7 .....6.25
Elyria,O. W8 .....6.25
FranklinPark,Ill. N5 ...6.25
Gary,Ind. R2 .....6.25
GreenBay,Wis. P7 .....6.25
Hammond,Ind. L2, M13..6.25
Hartford,Conn. R2 ....6.75
Harvey,Ill. B5 .....6.25
LosAngeles(49) S30 ....7.70
LosAngeles R2 .....7.70
Mansfield,Mass. B5 ....6.80
Massillon,O. R2 R8 ....6.25
Midland,Pa. C18 .....6.25
Monaca,Pa. S17 .....6.25
Newark,N.J. W18 .....6.70
NewCastle,Pa.(17) B4 ..6.25
Pittsburgh J5 .....6.25
Plymouth,Mich. P5 ....6.50
Putnam,Conn. W18 ....6.80
Readville,Mass. C14 ...6.80
S.Chicago,Ill. W14 .....6.25
SpringCity,Pa. W3 .....6.70
Struthers,O. Y1 .....6.25
Waukegan,Ill. A7 .....6.25
Worcester,Mass. W19 ...6.70
Youngstown F3, Y1 ....6.25

**BARS, Cold-Finished Carbon (Turned and Ground)**
Cumberland,Md.(5) C19..5.16

**BARS, Cold-Finished Alloy**
Ambridge,Pa. W18 ....7.425
BeaverFalls Pa. M12,R2 7.425
Bethlehem,Pa. B2 .....7.425
Buffalo B5 .....7.425
Camden,N.J. P13 .....7.80
Canton,O. T7 .....7.425
Carnegie,Pa. C12 .....7.425
Chicago W18 .....7.425
Cleveland A7, C20 ....7.425
Detroit R7 .....7.425
Detroit B5, P17 .....7.625
Donora,Pa. A7 .....7.425
Elyria,O. W8 .....7.425
Gary,Ind. R2 .....7.425
GreenBay,Wis. P7 .....7.425
Hammond,Ind. L2, M13..7.425
Hartford,Conn. R2 ....7.725
Harvey,Ill. B5 .....7.425
Lackawanna,N.Y. B2 ..7.425
LosAngeles S30 .....9.10
Mansfield,Mass. B5....7.725
Massillon,O. R2, R8 ...7.425
Midland,Pa. C18 .....7.425
Monaca,Pa. S17 .....7.425
Newark,N.J. W18 .....7.60
Plymouth,Mich. P5 ....7.625
S.Chicago W14 .....7.425
SpringCity,Pa. K3 .....7.60
Struthers,O. Y1 .....7.425
Warren,O. C17 .....7.425
Waukegan,Ill. A7 .....7.425
Worcester,Mass. A7 ...7.725
Youngstown F3, Y1 ....7.425

**BARS, Reinforcing (To Fabricators)**
Ala.City,Ala. R2 .....4.65
*Atlanta A11 .....5.15*
Birmingham C15 .....5.15
Buffalo R2 .....4.65
Cleveland R2 .....4.65
Ecorse,Mich. G5 .....4.75
Emeryville,Calif. J7 ....5.40
Fairfield,Ala. T2 .....4.65
Fairless,Pa. U5 .....4.80
Fontana,Calif. K1 .....5.35
Ft.Worth,Tex.(42) T4 ..5.10
Gary,Ind. U5 .....4.65
Houston 85 .....4.90

Ind.Harbor,Ind. I-2, Y1 4.65
Johnstown,Pa. B2 ....4.65
Joliet,Ill. P22 .....5.15
KansasCity,Mo. S5 ....4.90
Lackawanna,N.Y. B2 ..4.65
LosAngeles B3 .....5.35
Milton,Pa. M18 .....4.80
Minnequa,Colo. C10 ...5.10
Niles,Calif. P1 .....5.35
Pittsburg,Calif. C11 ...5.35
Pittsburgh J5 .....4.65
Portland,Oreg. O4 ....5.40
SandSprings,Okla. S5 ..5.15
Seattle B3, N14 .....5.40
S.Chicago R2 .....4.65
S.Duquesne Pa. U5 ....4.65
S.SanFrancisco B3 ....5.40
SparrowsPoint,Md. B2 ..4.65
Sterling,Ill.(1) N15 ....4.65
Sterling,Ill. N15 .....4.75
Struthers,O. Y1 .....4.65
Torrance,Calif. C11 ...5.35
Youngstown R2, U5 ....4.65

**BARS, Reinforcing**
**(Fabricated; to Consumers)**

Johnstown,Pa. ½-1" B2..6.15
KansasCity,Kans. S5 ...6.45
Lackawanna,N.Y. B2 ..6.17
Marion,O. P11 .....6.15
Pittsburgh U5 .....6.17
Seattle B3, N14 .....6.60
SparrowsPt. ½-1" B2 ..6.15
Williamsport,Pa. S19 ...6.00

**RAIL STEEL BARS**

ChicagoHts.(3) C2, I-2..4.65
ChicagoHts.(4) C2, I-2..4.65
Ft.Worth,Tex.(26) T4 ..5.10
Franklin,Pa. (3) F5 ....4.65
Franklin,Pa.(4) F5 ....4.65
JerseyShore,Pa.(4) J8 ..4.65
Marion,O.(3) P11 .....4.65
Moline,Ill.(3) R2 .....4.80
Tonawanda(3) B12 ....5.15
Tonawanda(4) B12 ....5.15
Williamsport,Pa.(3) S19.4.65

**BARS, Wrought Iron**

Economy,Pa.(S.R.)B14 11.50
Economy,Pa.(D.R.)B14 14.30
Economy(Staybolt)B14. 14.65
McK.Rks.(S.R.) L5 ...11.50
Mck.Rks.(D.R.) L5 ...16.00
Mck.Rks.(Staybolt) L5.17.00

# SHEETS

**SHEETS, Hot-Rolled Steel**
**(18 Gage and Heavier)**

Ala.City,Ala. R2 .....4.325
Allenport,Pa. P7 .....4.325
Ashland,Ky.(8) A10 ..4.325
Cleveland J5, R2 ....4.325
Conshohocken,Pa. A3 ..4.375
Detroit(8) M1 .....4.425
Dravosburg,Pa. U5 ....4.325
Ecorse,Mich. G5 .....4.425
Fairfield,Ala. T2 .....4.325
Fairless,Pa. U5 .....4.375
Fontana,Calif. K1 ....5.125
Gary,Ind. U5 .....4.325
Geneva,Utah C11 .....4.425
GraniteCity,Ill. G4 ...4.525
Ind.Harbor,Ind. I-2,Y1.4.325
Lackawanna,N.Y. B2 ..4.325
Mansfield,O. E6 (37) ..4.325
Munhall,Pa. U5 .....4.325
Newport,Ky.(8) N9 ...4.325
Niles,O. M21 .....4.325
Pittsburg,Calif. C11 ...5.025
Pittsburgh J5 .....4.325
Portsmouth,O. P12 ....4.325
Riverdale,Ill. A1 .....4.55
Sharon,Pa. S3 .....4.325
S.Chicago Ill. W14 ....4.325
SparrowsPoint,Md. B2..4.325
Steubenville,O. W10 ...4.325
Warren,O. R2 .....4.325
Weirton,W.Va. W6 ....4.325
Youngstown U5, Y1 ...4.325

**SHEETS, H.R., (19 Ga. & Lighter)**

Ala.City,Ala. R2 .....5.625
Niles,O. M21 .....5.325

**SHEETS, H.R. Alloy**

Dravosburg Pa. U5 ....7.20
Gary,Ind. U5 .....7.20
Ind.Harbor,Ind. Y1 ....7.20
Youngstown Y1, U5 ....7.20

**SHEETS, H.R. (14 Ga. & Heavier)**
**High-Strength Low-Alloy**

Cleveland J5, R2 .....6.375
Conshohocken,Pa. A3 ..6.425
Dravosburg,Pa. U5 ....6.375
Ecorse,Mich. G5 .....6.475
Fairfield,Ala. T2 .....6.375
Fairless,Pa. U5 .....6.425
Fontana,Calif. K1 ....7.175
Gary,Ind. U5 .....6.375
Ind.Harbor,Ind. I-2, Y1.6.375
Lackawanna(35) B2 ...6.375
Mushall,Pa. U5 .....6.375
Pittsburgh J5 .....6.375
Sharon,Pa. S3 .....6.375
S.Chicago,Ill. U5 ....6.375
SparrowsPoint(36) B2..6.375
Warren,O. R2 .....6.375
Youngstown U5, Y1 ...6.375

**SHEETS, Hot-Rolled Ingot Iron**
**(18 Gage and Heavier)**

Ashland,Ky.(8) A10 ..4.575
Ind.Harbor,Ind. I-2 ...4.575

**SHEETS, Cold-Rolled Steel**
**(Commercial Quality)**

Allenport,Pa. P7 .....5.325
Cleveland J5, R2 .....5.325
Conshohocken,Pa. A3 ..5.375
Dravosburg,Pa. U5 ....5.325
Detroit M1 .....5.325
Ecorse,Mich. G5 .....5.425
Fairfield,Ala. T2 .....5.325
Fairless,Pa. U5 .....5.375
Follansbee,W.Va. F4 ..5.325
Fontana,Calif. K1 ....6.525
Gary,Ind. U5 .....5.325
GraniteCity,Ill. G4 ....5.525
Ind.Harbor,Ind. I-2, Y1.5.325
Lackawanna,N.Y. B2 ..5.325
Mansfield,O. E6 .....5.325
Middletown,O. A10 ....5.325
Newport,Ky. N9 .....5.325
Pittsburg,Calif. C11 ..6.275
Pittsburgh J5 .....5.325
Portsmouth,O. P12 ....5.325
SparrowsPoint,Md. B2..5.325
Steubenville,O. W10 ...5.325
Warren,O. R2 .....5.325
Weirton,W.Va. W6 ....5.325
Youngstown Y1 .....5.325

**SHEETS, Cold-Rolled**
**High-Strength Low-Alloy**

Cleveland J5, R2 .....7.875
Dravosburg,Pa. U5 ....7.875
Ecorse,Mich. G5 .....7.975
Fairless,Pa. U5 .....7.925
Fontana,Calif. K1 ....9.075
Gary,Ind. U5 .....7.875
IndianaHarbor,Ind. Y1.7.875
Lackawanna(37) B2 ..7.875
Pittsburgh J5 .....7.875
SparrowsPoint(38) B2..7.875
Warren,O. R2 .....7.875
Weirton,W.Va. W6 ....7.875
Youngstown Y1 .....7.875

**SHEETS, Cold-Rolled Ingot Iron**

Middletown,O. A10 ....5.825

| SHEETS, Culvert (16 Gage) | Cu Alloy | Cu Fe |
|---|---|---|
| Ashland,Ky. A10 | 6.90 | ... |
| Canton,O. R2 | 6.10 | 6.55 |
| Dravosburg U5 | 6.10 | ... |
| Fairfield T2 | 6.10 | ... |
| Gary,Ind. U5 | 6.10 | 6.35 |
| Ind.Harbor I-2 | 6.10 | 6.35 |
| Kokomo,Ind. C16 | 6.20 | ... |
| MartinsFry. W10 | 6.10 | ... |
| Newport,Ky. N9 | 6.10 | 6.35 |
| Pitts.,Calif. C11 | 6.85 | ... |
| SparrowsPt. B2 | 6.10 | ... |

**SHEETS, Culvert—Pure Iron**

Ashland,Ky. A10 .....7.15
Gary,Ind. U5 .....6.35
MartinsFry,O. W10 ....6.35

**SHEETS, Galvanized Steel**
**Hot-Dipped**

Ala.City,Ala. R2 .....5.85†
Ashland,Ky. A10 .....5.85†
Canton,O. R2 .....5.85†
Dover,O. R1 .....5.85†
Dravosburg,Pa. U5 ....5.85†
Fairfield,Ala. T2 .....5.85†
Gary,Ind U5 .....5.85*
GraniteCity Ill. G4 ....6.05
Ind.Harbor,Ind. I-2 ...5.85†
Kokomo,Ind. C16 .....5.95†
MartinsFerry,O. W10 ..5.85*
Middletown O. A10 ....5.85†
Newport,Ky. N9 .....5.85†
Pittsburg,Calif. C11 ...6.60*
Pittsburgh J5 .....5.85†
SparrowsPt.,Md. B2 ...5.85†
Warren,O. R2 .....5.85†
Weirton,W.Va. W6 ...5.85*

*Continuous and noncontinuous. †Continuous. ‡Noncontinuous.

**SHEETS, Well Casing**

Fontana,Calif. K1 ....6.625

**SHEETS, Galvanized**
**High-Strength Low-Alloy**

Dravosburg,Pa. U5 ....8.60
SparrowsPoint(39) B2 ..8.60

**SHEETS, Galvannealed Steel**

Canton,O. R2 .....6.25
Dravosburg,Pa. U5 ....6.25
Kokomo,Ind. C16 .....6.60
Newport,Ky. N9 .....6.25

**SHEETS, Galvanized Ingot Iron**
**(Hot-dipped Continuous)**

Ashland,Ky. A10 .....6.10
Middletown,O. A10 .....6.10

**SHEETS, Electrogalvanized**

Cleveland(28) R2 .....6.70
Niles,O.(28) R2 .....6.70
Weirton,W.Va. W6 ....6.55

**SHEETS, Aluminum Coated**

Butler,Pa. A10 (type 1).8.50
Butler,Pa. A10 (type 2).8.60

**SHEETS, Enameling Iron**

Ashland,Ky. A10 .....5.90
Cleveland R2 .....5.90
Dravosburg,Pa. U5 ....5.90
Gary,Ind. U5 .....5.90
GraniteCity,Ill. G4 ....6.10
Ind.Harbor,Ind. I-2 ...5.90
Middletown,O. A10 ....5.90
Niles,O. M21 .....5.90
Youngstown Y1 .....5.90

**BLUED STOCK, 29 Gage**

Follansbee,W.Va. F4 ...7.75
Ind.Harbor,Ind. I-2 ....7.75
Yorkville,O. W10 .....7.75

**SHEETS, Long Terne Steel**
**(Commercial Quality)**

BeechBottom,W.Va. W10 6.25
Gary,Ind. U5 .....6.25
Mansfield,O. E6 .....6.25
Middletown O. A10 ....6.25
Niles,O. M21 .....6.25
Weirton,W.Va. W6 ....6.25

**SHEETS, Long Terne, Ingot Iron**

Middletown,O. A10 ....6.65

## Key To Producers

A1 Acme Steel Co.
A3 Alan Wood Steel Co.
A4 Allegheny Ludlum Steel
A5 Alloy Metal Wire Div., H. K. Porter Co. Inc.
A6 American Shim Steel Co.
A7 American Steel & Wire Div., U. S. Steel Corp.
A8 Anchor Drawn Steel Co.
A9 Angell Nail & Chaplet
A10 Armco Steel Corp.
A11 Atlantic Steel Co.

B1 Babcock & Wilcox Co.
B2 Bethlehem Steel Co.
B3 Beth. Pac. Coast Steel
B4 Blair Strip Steel Co.
B5 Bliss & Laughlin Inc.
B8 Braeburn Alloy Steel
B9 Brainard Steel Div., Sharon Steel Corp.
B10 E. & G. Brooke. Wickwire Spencer Steel Div. Colo. Fuel & Iron
B11 Buffalo Bolt Co., Div., Buffalo-Eclipse Corp.
B12 Buffalo Steel Corp.
B14 A. M. Byers Co.
B15 J. Bishop & Co.

C1 Calstrip Steel Corp.
C2 Calumet Steel Div. Borg-Warner Corp.
C4 Carpenter Steel Co.
C7 Cleve. Cold Rolling Mills
C8 Cold Metal Products Co.
C9 Colonial Steel Co.
C10 Colorado Fuel & Iron
C11 Columbia-Geneva Steel
C12 Columbia Steel & Shaft.
C13 Columbia Tool Steel Co.
C14 Compressed Steel Shaft.
C15 Connors Steel Div. H. K. Porter Co. Inc.
C16 Continental Steel Corp.
C17 Copperweld Steel Co.
C18 Crucible Steel Co.
C19 Cumberland Steel Co.
C20 Cuyahoga Steel & Wire
C22 Claymont Steel Products Dept. Wickwire Spencer Steel Division
C23 Charter Wire Inc.
C24 G. O. Carlson Inc.

D2 Detroit Steel Corp.
D3 Detroit Tube & Steel Div., Sharon Steel Corp.
D4 Disston & Sons, Henry
D6 Driver-Harris Co.
D7 Dickson Weatherproof Nail Co.
D8 Damascus Tube Co.
D9 Wilbur B. Driver Co.

E1 Eastern Gas&Fuel Assoc.
E2 Eastern Stainless Steel
E4 Electro Metallurgical Co.
E5 Elliott Bros. Steel Co.
E6 Empire Steel Corp.

F2 Firth Sterling Inc.
F3 Fitzsimmons Steel Co.
F4 Follansbee Steel Corp.
F5 Franklin Steel Div. Borg-Warner Corp.
F6 Fretz-Moon Tube Co.
F7 Ft. Howard Steel & Wire
F8 Ft. Wayne Metals Inc.

G2 Globe Iron Co.
G4 Granite City Steel Co.
G5 Great Lakes Steel Corp.
G6 Greer Steel Co.

H1 Hanna Furnace Corp.
H7 Helical Tube Co.

I-1 Igoe Bros. Inc.
I-2 Inland Steel Co.
I-3 Interlake Iron Corp.
I-4 Ingersoll Steel Div., Borg-Warner Corp.
I-6 Ivins, E., Steel Tube
I-7 Indiana Steel & Wire Co.

J1 Jackson Iron & Steel Co.
J3 Jessop Steel Co.
J4 Johnson Steel & Wire Co.
J5 Jones & Laughlin Steel
J6 Joslyn Mfg. & Supply
J7 Judson Steel Corp.
J8 Jersey Shore Steel Co.

K1 Kaiser Steel Corp.
K2 Keokuk Electro-Metals
K3 Keystone Drawn Steel
K4 Keystone Steel & Wire
K7 Kenmore Metals Corp.

L1 Laclede Steel Co.
L2 LaSalle Steel Co.
L3 Latrobe Steel Co.
L5 Lockhart Iron & Steel
L6 Lone Star Steel Co.
L7 Lukens Steel Co.

M1 McLouth Steel Corp.
M4 Mahoning Valley Steel
M6 Mercer Pipe Div., Sawhill Tubular Products
M8 Mid-States Steel & Wire
M12 Moltrup Steel Products
M13 Monarch Steel Div., Jones & Laughlin Steel Corp.
M14 McInnes Steel Co.
M16 Md. Fine& Special. Wire
M17 Metal Forming Corp.
M18 Milton Steel Prod., Div., Merritt-Chapman&Scott
M21 Mallory-Sharon Titanium Corp.

N1 National-Standard Co.
N2 National Supply Co.
N3 National Tube Div., U. S. Steel Corp.
N5 Nelsen Steel & Wire Co.
N6 New Eng. High Carb. Wire
N8 Newman-Crosby Steel
N19 Northeastern Steel Corp.
N14 Northwest.SteelRoll.Mills
N15 Northwestern S.&W. Co.
N16 New Delphos Mfg. Co.
N19 Noreastern Steel Corp.
O3 Oliver Iron & Steel Corp.
O4 Oregon Steel Mills

P1 PacificStatesSteelCorp.
P2 Pacific Tube Co.
P4 Phoenix Iron & Steel Co. Sub. of Barium Steel Corp.
P5 Pilgrim Drawn Steel
P6 Pittsburgh Coke&Chem.
P7 Pittsburgh Steel Co.
P11 Pollak Steel Co.
P12 Portsmouth Division, Detroit Steel Corp.
P13 Precision Drawn Steel
P14 Pitts. Screw & Bolt Co.
P15 Pittsburgh Metallurgical
P16 Page Steel & Wire Div., Amer. Chain & Cable
P17 Plymouth Steel Co.
P19 Pitts. Rolling Mills
P20 Prod. Steel Strip Corp.
P22 Phoenix Mfg. Co.

R1 Reeves Steel & Mfg. Co.
R2 Republic Steel Corp.
R3 Rhode Island Steel Corp.
R5 Roebling's Sons, John A.
R6 Rome Strip Steel Co.
R7 Rotary Electric Steel Co.
R8 Reliance Div.,Eaton Mfg.
R9 Rome Mfg. Co.
R10 Rodney Metals Inc.

S1 Seneca Wire & Mfg. Co.
S3 Sharon Steel Corp.
S4 Sharon Tube Co.
S5 Sheffield Steel Div., Armco Steel Corp.
S6 Shenango Furnace Co.
S7 Simmons Co.
S8 Simonds Saw & Steel Co.
S12 Spencer Wire Corp.
S13 Standard Forgings Corp.
S14 Standard Tube Co.
S15 Stanley Works
S17 Superior Drawn Steel Co.
S18 Superior Steel Corp.
S19 Sweet's Steel Co.
S20 Southern States Steel
S23 Superior Tube Co.
S25 Stainless Welded Prod.
S26 Specialty Wire Co. Inc.
S30 Sierra Drawn Steel Corp.
S40 Seneca Steel Service

T2 Tenn. Coal & Iron Div., U. S. Steel Corp.
T3 Tenn. Prod. & Chem.
T4 Texas Steel Co.
T5 Thomas Strip Division, Pittsburgh Steel Co.
T6 Thompson Wire Co.
T7 Timken Roller Bearing
T9 Tonawanda Iron Div. Am. Rad. & Stan. San.
T13 Tube Methode Inc.

U4 Universal-Cyclops Steel
U5 United States Steel Corp.
U6 U. S. Pipe & Foundry
U7 Ulbrich Stainless Steels
U8 U. S. Steel Supply Div. U. S. Steel Corp.

V2 Vanadium-Alloys Steel
V3 Vulcan Crucible Div., H. K. Porter Co. Inc.

W1 Wallace Barnes Co.
W2 Wallingford Steel Co.
W3 Washburn Wire Co.
W4 Washington Steel Corp.
W6 Weirton Steel Co.
W7 W. Va. Steel & Mfg. Co.
W8 Western Automatic Machine Screw Co.
W9 Wheatland Tube Co.
W10 Wheeling Steel Corp.
W12 Wickwire Spencer Steel Div., Colo. Fuel & Iron
W13 Wilson Steel & Wire Co.
W14 Wisconsin Steel Div., International Harvester
W15 Woodward Iron Co.
W18 Wyckoff Steel Co.
W19 Worcester Pressed Steel

Y1 Youngstown Sheet&Tube

## STRIP

**STRIP, Hot-Rolled Carbon**

| | |
|---|---|
| Ala.City,Ala.(27) R2 | 4.325 |
| Allenport,Pa. F7 | 4.325 |
| Alton,Ill. L1 | 4.50 |
| Ashland,Ky.(8) A10 | 4.325 |
| Atlanta A11 | 4.525 |
| Bessemer,Ala. T2 | 4.325 |
| Birmingham C15 | 4.825 |
| Bridgeport,Conn. N19 | 4.625 |
| Buffalo(27) R2 | 4.325 |
| Conshohocken,Pa. A3 | 4.375 |
| Detroit M1 | 4.425 |
| Ecorse,Mich. G5 | 4.425 |
| Fairfield,Ala. T2 | 4.325 |
| Fontana,Calif. K1 | 5.125 |
| Gary,Ind. U5 | 4.325 |
| Ind.Harbor,Ind. I-2,Y1 | 4.325 |
| Johnstown,Pa.(25) B2 | 4.325 |
| Lackaw'na,N.Y.(34) B2 | 4.325 |
| LosAngeles(25) B3 | 5.075 |
| Milton,Pa. M18 | 4.325 |
| M'nnequa,Colo. C10 | 5.425 |
| Pittsburg Calif. C11 | 5.075 |
| Riverdale Ill. A1 | 4.55 |
| SanFrancisco S7 | 5.05 |
| Seattle(25) B3 | 5.325 |
| Seattle N14 | 5.40 |
| Sharon,Pa. S3 | 4.325 |
| S.Chicago,Ill. W14 | 4.325 |
| S.SanFrancisco(25) B3 | 5.075 |
| SparrowsPoint,Md. B2 | 4.325 |
| Sterling(1) N15 | 4.325 |
| Sterling,Ill. N15 | 4.425 |
| Torrance,Calif. C11 | 5.075 |
| Warren,O. R2 | 4.325 |
| Weirton,W.Va. W6 | 4.325 |
| Youngstown U5 | 4.325 |

**STRIP, Hot-Rolled Alloy**

| | |
|---|---|
| Bridgeport,Conn. N19 | 7.80 |
| Carnegie,Pa. S18 | 7.20 |
| Fontana,Calif. K1 | 8.95 |
| Gary,Ind. U5 | 7.20 |
| Ind.Harbor,Ind. Y1 | 7.20 |
| LosAngeles B3 | 8.40 |
| Newport,Ky. N9 | 7.20 |
| Sharon,Pa. S3 | 7.20 |
| S.Chicago W14 | 7.20 |
| Youngstown U5, Y1 | 7.20 |

**STRIP, Hot-Rolled High-Strength Low-Alloy**

| | |
|---|---|
| Bessemer,Ala. T2 | 6.425 |
| Conshohocken,Pa. A3 | 6.425 |
| Ecorse,Mich. G5 | 6.525 |
| Fairfield,Ala. T2 | 6.425 |
| Fontana,Calif. K1 | 7.575 |
| Gary,Ind. U5 | 6.425 |
| Houston S5 | 6.675 |
| Ind.Harbor,Ind. I-2,Y1 | 6.425 |
| KansasCity,Mo. S5 | 6.675 |
| Lackawanna,N.Y. B2 | 6.425 |
| LosAngeles(25) B3 | 7.175 |
| Seattle(25) B3 | 7.425 |
| Sharon,Pa. S3 | 6.425 |
| S.SanFrancisco(25) B3 | 7.175 |
| SparrowsPoint,Md. B2 | 6.425 |
| Warren,O. R2 | 6.425 |
| Weirton,W.Va. W6 | 6.425 |
| Youngstown U5, Y1 | 6.425 |

**STRIP, Hot-Rolled Ingot Iron**

| | |
|---|---|
| Ashland,Ky.(8) A10 | 4.575 |

**STRIP, Cold-Rolled Carbon**

| | |
|---|---|
| Anderson,Ind. G6 | 6.25 |
| Baltimore T6 | 6.25 |
| Boston T6 | 6.80 |
| Buffalo S40 | 6.25 |
| Cleveland A7, J5 | 6.25 |
| Conshohocken,Pa. A3 | 6.30 |
| Dearborn,Mich. D3 | 6.35 |
| Detroit D2, M1, P20 | 6.35 |
| Dover,O. G6 | 6.25 |
| Ecorse,Mich. G5 | 6.35 |
| Follansbee,W.Va. F4 | 6.25 |
| Fontana,Calif. K1 | 8.00 |
| FranklinPark,Ill. T6 | 6.35 |
| Ind.Harbor,Ind. I-2 | 6.35 |
| Ind.Harbor,Ind. Y-1 | 6.25 |
| Indianapolis C8 | 6.40 |
| Lackawanna,N.Y. B2 | 6.25 |
| LosAngeles C1 | 8.30 |
| NewBedford,Mass. R10 | 6.70 |
| NewBritain(10) S15 | 6.25 |
| NewCastle,Pa. B4, E5 | 6.25 |
| NewHaven,Conn. A7, D2 | 6.70 |
| NewKensington,Pa. A6 | 6.25 |
| Pawtucket,R.I. R3 | 6.90 |
| Pawtucket,R.I. N8 | 6.80 |
| Pittsburgh J5 | 6.25 |
| Riverdale,Ill. A1 | 6.35 |
| Rome,N.Y.(32) R6 | 6.25 |
| Sharon,Pa. S3 | 6.25 |
| SparrowsPt.,Md. B2 | 6.25 |
| Trenton,N.J.(31) R5 | 7.80 |
| Wallingford,Conn. W2 | 6.70 |
| Warren,O. R2, T5 | 6.25 |
| Weirton,W.Va. W6 | 6.25 |
| Youngstown C8, Y1 | 6.25 |

**STRIP, Cold-Rolled Alloy**

| | |
|---|---|
| Boston T6 | 13.80 |
| Carnegie,Pa. S18 | 13.45 |
| Cleveland A7 | 13.45 |
| Dover,O. G6 | 13.45 |
| FranklinPark,Ill. T6 | 13.45 |
| Harrison,N.J. C18 | 13.45 |
| Indianapolis C8 | 13.60 |
| Pawtucket,R.I. N8 | 13.80 |
| Sharon,Pa. S3 | 13.45 |
| Worcester,Mass. A7 | 13.75 |
| Youngstown C8 | 13.45 |

**STRIP, Cold-Rolled High-Strength, Low-Alloy**

| | |
|---|---|
| Cleveland A7 | 9.10 |
| Dearborn,Mich. D3 | 9.20 |
| Dover,O. G6 | 9.30 |
| Ecorse,Mich. G5 | 9.20 |
| Ind.Harbor,Ind. Y1 | 9.30 |

| STRIP, Cold-Finished Spring Steel (Annealed) | 0.26-0.40C | 0.41-0.60C | 0.61-0.80C | 0.81-1.05C | 1.06-1.35C |
|---|---|---|---|---|---|
| Baltimore T6 | 7.40 | 9.35 | 10.90 | 13.05 | 15.75 |
| Boston T6 | 7.65 | 9.35 | 10.90 | 13.05 | 15.75 |
| Bristol,Conn. W1 | ... | ... | 10.90 | 13.05 | 15.75 |
| Carnegie,Pa. S18 | ... | 9.05 | 10.60 | 12.75 | .... |
| Cleveland A7 | 7.10 | 9.05 | 10.60 | 12.75 | 15.45 |
| Cleveland C7 | ... | 9.05 | 10.60 | 12.75 | 15.45 |
| Dearborn,Mich. D3 | 7.20 | 9.15 | 10.70 | ... | .... |
| Detroit D2 | 7.20 | 9.15 | 10.70 | 12.85 | .... |
| Dover,O. G6 | 7.10 | 9.05 | 10.60 | 12.75 | 15.45 |
| FranklinPark,Ill. T6 | 7.20 | 9.05 | 10.60 | 12.75 | 15.45 |
| Harrison,N.J. C18 | ... | ... | 10.90 | 13.05 | 15.75 |
| Indianapolis C8 | 7.25 | 9.20 | 10.60 | 12.75 | 15.45 |
| NewBritain,Conn.(10) S15 | 7.10 | 9.05 | 10.60 | 12.75 | 15.45 |
| NewCastle,Pa. B4, E5 | 7.10 | 9.05 | 10.60 | 12.75 | .... |
| NewHaven,Conn. D2 | 7.55 | 9.35 | 10.90 | 13.05 | .... |
| NewKensington,Pa. A6 | 7.10 | 9.05 | 10.60 | .... | .... |
| NewYork W3 | ... | 9.35 | 10.90 | 13.05 | 15.75 |
| Pawtucket,R.I. N8 | 7.65 | 9.35 | 10.90 | 13.05 | 15.75 |
| Riverdale,Ill. A1 | 7.20 | 9.05 | 10.60 | 12.75 | 15.45 |
| Rome,N.Y.(32) R6 | 7.10 | 9.05 | 10.60 | 12.75 | 15.45 |
| Sharon,Pa. S3 | 7.10 | 9.05 | 10.60 | 12.75 | 15.45 |
| Trenton,N.J. R5 | ... | 9.35 | 10.90 | 13.05 | 15.75 |
| Wallingford,Conn. W2 | 7.55 | 9.35 | 10.90 | 13.05 | 15.75 |
| Warren,O. T5 | 7.10 | 9.05 | 10.60 | 12.75 | 15.45 |
| Weirton,W.Va. W6 | 7.10 | 9.05 | 10.60 | 12.75 | 15.45 |
| Worcester,Mass. A7, T6 | 7.65 | 9.35 | 10.90 | 13.05 | 15.75 |
| Youngstown C8 | 7.10 | 9.05 | 10.60 | 12.75 | 15.45 |

| Spring Steel (Tempered) | | | | | |
|---|---|---|---|---|---|
| Bristol,Conn. W1 | ... | ... | 14.80 | 18.15 | .... |
| Buffalo W12 | ... | ... | 14.80 | .... | .... |
| FranklinPark,Ill. T6 | ... | ... | 15.15 | 18.50 | 22.35 |
| Harrison,N.J. C18 | ... | ... | 14.80 | 18.15 | 22.00 |
| NewYork W3 | ... | ... | 14.80 | 18.15 | 22.00 |
| Trenton,N.J. R5 | ... | ... | 14.80 | 18.15 | 22.00 |
| Worcester,Mass. W12 | ... | ... | 14.80 | .... | .... |
| Worcester,Mass. A7, T6 | ... | ... | 14.80 | 18.15 | 22.00 |
| Youngstown C8 | ... | ... | 15.15 | 18.50 | 22.35 |

## SILICON STEEL

| H.R. SHEETS(22 Ga.,cut lengths) | Field | Armature | Electric | Motor | Dynamo |
|---|---|---|---|---|---|
| BeechBottom,W.Va. W10 | ... | ... | 9.95 | 10.95 | 11.85 |
| Brackenridge,Pa. A4 | ... | ... | 9.95 | 10.95 | 11.85 |
| Mansfield,O. E6 | 8.40 | 9.35 | 9.95 | 10.95 | 11.85 |
| Newport,Ky. N9 | 8.40 | 9.35 | 9.95 | 10.95 | 11.85 |
| Niles,O. M21 | 8.40 | 9.35 | 9.95 | 10.95 | .... |
| Vandergrift,Pa. U5 | ... | 9.35 | 9.95 | 10.95 | 11.85 |
| Warren,O. R2 | 8.40 | 9.35 | 9.95 | 10.95 | 11.85 |
| Zanesville,O. A10 | ... | 9.35 | 9.95 | 10.95 | 11.85 |

**C.R. COILS & CUT LENGTHS, (22 Ga.)**

| Fully Processed (Semiprocessed ½c lower) | Field | Armature | Electric | Motor | Dynamo |
|---|---|---|---|---|---|
| Brackenridge,Pa. A4 | .... | .... | 10.70 | 11.70 | 12.60 |
| GraniteCity,Ill. G4 | 8.80* | 9.80* | 10.40* | 11.40 | .... |
| IndianaHarbor,Ind. I-2 | 8.60† | 9.60* | 10.20* | 11.20* | .... |
| Vandergrift,Pa. U5 | 8.60* | 9.60* | 10.20* | 11.20* | 12.10* |
| Vandergrift,Pa. U5 | .... | 10.10† | 10.70† | 11.70† | 12.60† |
| Warren,O. R2 | 8.60† | 10.10 | 10.70 | 11.70 | 12.60 |

| H.R. SHEETS (22 Ga., cut lengths) | Transformer Grade T-72 | T-63 | T-58 | T-52 |
|---|---|---|---|---|
| BeechBottom,W.Va. W10 | 12.80 | 13.35 | 13.85 | 14.85 |
| Brackenridge,Pa. A4 | 12.80 | .... | .... | .... |
| Newport,Ky. N9 | 12.80 | .... | .... | .... |
| Vandergrift,Pa. U5 | 12.80 | 13.35 | 13.85 | 14.85 |
| Zanesville,O. A10 | 12.80‡ | 13.35‡ | 13.85‡ | 14.85‡ |

| C.R. COILS & CUT LENGTHS (22 Ga.) | Grain Oriented T-100 | T-90 | T-80 | T-73 | T-66 | T-72 |
|---|---|---|---|---|---|---|
| Brackenridge,Pa. A4 | .... | 15.85 | 17.45 | 17.95 | 18.45 | 13.55** |
| Butler,Pa. A10 | .... | .... | 17.45 | 17.95 | .... | .... |
| Vandergrift,Pa. U5 | 14.85 | 15.85 | 17.45 | 17.95 | .... | 13.55 |
| Warren,O. R2 | .... | .... | .... | .... | .... | 13.55‡ |

*Semiprocessed. †Fully processed only. ‡Coils, annealed, semiprocessed ½c lower. §Coils, ¾-cent higher. **Cut lengths, ¾-cent lower.

| Lackawanna,N.Y. B2 | 9.10 |
|---|---|
| Sharon,Pa. S3 | 9.10 |
| SparrowsPoint,Md. B2 | 9.10 |
| Warren,O. R2 | 9.10 |
| Weirton,W.Va. W6 | 9.10 |
| Youngstown Y1 | 9.30 |

**STRIP, Electrogalvanized**

| | |
|---|---|
| Cleveland A7 | 6.25* |
| Dover,O. G6 | 6.25* |
| Riverdale,Ill. A1 | 6.35* |
| Warren,O. B9, T5 | 6.25* |
| Worcester,Mass. A7 | 6.80* |
| Youngstown C8 | 6.25* |

*Plus galvanizing extras.

**STRIP, Galvanized (Continuous)**

| | |
|---|---|
| Sharon,Pa. S3 | 6.55 |

**TIGHT COOPERAGE HOOP**

| | |
|---|---|
| Atlanta A11 | 5.05 |
| Riverdale,Ill. A1 | 4.90 |
| Sharon,Pa. S3 | 4.75 |
| Youngstown U5 | 4.75 |

## TIN MILL PRODUCTS

| TIN PLATE Electrolytic (Base Box) | 0.25 lb | 0.50 lb | 0.75 lb |
|---|---|---|---|
| Aliquippa,Pa. J5 | $8.30 | $8.55 | $8.85 |
| Dravosburg,Pa. U5 | 8.30 | 8.55 | 8.95 |
| Fairfield,Ala. T2 | 8.40 | 8.65 | 9.05 |
| Fontana,Calif. K1 | 9.05 | 9.30 | 9.70 |
| Fairless,Pa. U5 | 8.40 | 8.65 | 9.05 |
| Gary,Ind. U5 | 8.30 | 8.55 | 8.95 |
| GraniteCity,Ill. G4 | 8.40 | 8.65 | 9.05 |
| IndianaHarbor,Ind. I-2, Y-1 | 8.30 | 8.55 | 8.95 |
| Niles,O. R2 | 8.30 | 8.55 | 8.95 |
| Pittsburg,Calif. C11 | 9.05 | 9.30 | 9.70 |
| SparrowsPoint,Md. B2 | 8.40 | 8.65 | 9.05 |
| Weirton,W.Va. W6 | 8.30 | 8.55 | 8.95 |
| Yorkville,O. W10 | 8.30 | 8.55 | 8.95 |

| ELECTROTIN (22-27 Gage; Dollars per 100 lb) | | | |
|---|---|---|---|
| Aliquippa,Pa. J5 | 6.975 | .... | .... |
| Niles,O. R2 | 6.975 | 7.175 | 7.375 |

| TINPLATE, American | 1.25 lb | 1.50 lb |
|---|---|---|
| Aliquippa,Pa. J5 | $9.60 | $9.85 |
| Dravosburg,Pa. U5 | 9.60 | 9.85 |
| Fairfield,Ala. T2 | 9.70 | 9.95 |
| Fairless,Pa. U5 | 9.70 | 9.95 |
| Fontana,Calif. K1 | 10.35 | 10.60 |
| Gary,Ind. U5 | 9.60 | 9.85 |
| Ind.Har. I-2, Y1 | 9.60 | 9.85 |
| Pitts.,Calif. C11 | 10.35 | 10.60 |
| Sp.Pt.,Md. B2 | 9.70 | 9.95 |
| Weirton,W.Va. W6 | 9.60 | 9.85 |
| Yorkville,O. W10 | 9.60 | 9.85 |

| BLACK PLATE (Base Box) | |
|---|---|
| Aliquippa,Pa. J5 | $7.40 |
| Dravosburg,Pa. U5 | 7.40 |
| Fairfield,Ala. T2 | 7.50 |
| Fairless,Pa. U5 | 7.50 |
| Fontana,Calif. K1 | 8.15 |
| Gary,Ind. U5 | 7.40 |
| GraniteCity,Ill. G4 | 7.50 |
| Ind.Harbor,Ind. I-2, Y1 | 7.40 |
| Niles,O. R2 | 7.40 |
| Pittsburg,Calif. C11 | 8.15 |
| SparrowsPoint,Md. B2 | 7.50 |
| Warren,O. R2 | 7.40 |
| Weirton,W.Va. W6 | 7.40 |
| Yorkville,O. W10 | 7.40 |

**HOLLOWARE ENAMELING Black Plate (29 Gage)**

| | |
|---|---|
| DravosburgPa. U5 | 7.05 |
| Gary,Ind. U5 | 7.05 |
| GraniteCity,Ill. G4 | 6.75 |
| Ind.Harbor,Ind. Y1 | 7.05 |
| Yorkville,O. W10 | 7.05 |

**MANUFACTURING TERNES (Special Coated; Base Box)**

| | |
|---|---|
| Dravosburg,Pa. U5 | $9.10 |
| Gary,Ind. U5 | 9.10 |
| Yorkville,O. W10 | 9.10 |

**MANUFACTURING TERNES (Light Coated, 6 lb; Base Box)**

| | |
|---|---|
| Yorkville,O. W10 | $9.55 |

**ROOFING SHORT TERNES (8 lb Coated; Base Box)**

| | |
|---|---|
| Gary,Ind. U5 | $10.65 |

## WIRE

**WIRE, Manufacturers Bright, Low Carbon**

| | |
|---|---|
| AlabamaCity,Ala. R2 | 6.60 |
| Aliquippa,Pa. J5 | 6.60 |
| Alton,Ill. L1 | 6.775 |
| Atlanta A11 | 6.80 |
| Bartonville,Ill. K4 | 6.70 |
| Buffalo W12 | 6.60 |
| Chicago W13 | 6.60 |
| Cleveland A7 | 6.60 |
| Crawfordsville,Ind. M8 | 6.70 |
| Donora,Pa. A7 | 6.60 |
| Duluth,Minn. A7 | 6.60 |
| Fairfield,Ala. T2 | 6.60 |
| Fostoria,O. (24) S1 | 6.80 |
| Houston S5 | 6.85 |
| Jacksonville,Fla. M8 | 6.95 |
| Johnstown,Pa. B2 | 6.60 |
| Joliet,Ill. A7 | 6.60 |
| KansasCity,Mo. S5 | 6.85 |
| Kokomo,Ind. C16 | 6.70 |
| LosAngeles B3 | 7.55 |
| Minnequa,Colo. C10 | 6.85 |
| Monessen,Pa. P7 | 6.60 |
| Newark 6-8 ga. I-1 | 6.90 |
| N.Tonawanda B11 | 6.60 |
| Palmer,Mass. W12 | 6.90 |
| Pittsburg,Calif. C11 | 7.55 |
| Portsmouth,O. P12 | 6.60 |
| Rankin,Pa. A7 | 6.60 |
| S.Chicago,Ill. R2 | 6.60 |
| S.SanFrancisco C10 | 7.55 |
| SparrowsPoint,Md. B2 | 6.70 |
| Sterling,Ill.(1) N15 | 6.60 |
| Sterling,Ill. N15 | 6.70 |
| Struthers,O. Y1 | 6.60 |
| Waukegan,Ill. A7 | 6.60 |
| Worcester,Mass. A7 | 6.90 |

**WIRE, MB Spring, High Carbon**

| | |
|---|---|
| Aliquippa,Pa. J5 | 7.90 |
| Alton,Ill. L1 | 8.075 |
| Bartonville,Ill. K4 | 8.00 |
| Buffalo W12 | 7.90 |
| Cleveland A7 | 7.90 |
| Donora,Pa. A7 | 7.90 |
| Duluth,Minn. A7 | 7.90 |
| Fostoria,O. S1 | 7.95 |
| Johnstown,Pa. B2 | 7.90 |
| LosAngeles B3 | 8.85 |
| Milbury,Mass.(12) N6 | 8.20 |
| Minnequa,Colo. C10 | 8.15 |
| Monessen,Pa. P16 | 7.90 |
| Muncie,Ind. I-7 | 8.10 |
| Palmer,Mass. W12 | 8.20 |
| Pittsburg,Calif. C11 | 8.85 |
| Portsmouth,O. P12 | 7.90 |
| Roebling,N.J. R5 | 8.20 |
| S.Chicago,Ill. R2 | 7.90 |
| S.SanFrancisco C10 | 8.85 |
| SparrowsPt.,Md. B2 | 8.00 |
| Struthers,O. Y1 | 7.90 |
| Trenton,N.J. A7 | 8.20 |
| Waukegan,Ill. A7 | 7.90 |
| Worcester A7,J4,T6,W12 | 8.20 |

**WIRE, Upholstery Spring**

| | |
|---|---|
| Aliquippa,Pa. J5 | 7.60 |
| Alton,Ill. L1 | 7.775 |
| Buffalo W12 | 7.60 |
| Cleveland A7 | 7.60 |
| Donora,Pa. A7 | 7.60 |
| Duluth,Minn. A7 | 7.60 |
| Johnstown,Pa. B2 | 7.60 |
| KansasCity,Mo. S5 | 7.85 |
| LosAngeles B3 | 8.55 |
| Minnequa,Colo. C10 | 7.775 |
| Monessen,Pa. P16 | 7.60 |
| NewHaven,Conn. A7 | 7.90 |
| PalmerMass. W12 | 7.90 |
| Pittsburg,Calif. C11 | 8.55 |
| Portsmouth,O. P12 | 7.60 |
| Roebling,N.J. R5 | 7.90 |
| S.Chicago,Ill. R2 | 7.60 |
| S.SanFrancisco C10 | 8.55 |
| SparrowsPoint,Md. B2 | 7.70 |
| Struthers,O. Y1 | 7.60 |
| Trenton,N.J. A7 | 7.90 |
| Waukegan,Ill. A7 | 7.60 |
| Worcester,Mass. A7 | 7.90 |

**WIRE, Fine & Weaving(8" Coils)**

| | |
|---|---|
| Alton,Ill. L1 | 12.725 |
| Bartonville,Ill. K4 | 12.65 |
| Buffalo W12 | 12.55 |
| Chicago W13 | 12.55 |
| Cleveland A7 | 12.55 |
| Crawfordsville,Ind. M8 | 12.65 |
| Fostoria,O. S1 | 12.55 |
| Jacksonville,Fla. M8 | 12.90 |
| Johnstown,Pa. B2 | 12.55 |
| Kokomo,Ind. C16 | 12.55 |
| Minnequa,Colo. C10 | 12.30 |
| Monessen,Pa. P6 | 12.55 |
| Muncie,Ind. I-7 | 12.75 |
| Palmer,Mass. W12 | 12.85 |
| Roebling,N.J. R5 | 12.85 |
| S.SanFrancisco C10 | 12.90 |
| Waukegan,Ill. A7 | 12.55 |
| Worcester,Mass. A7,T6 | 12.85 |

**WIRE, Gal'd ACSR for Cores**

| | |
|---|---|
| Bartonville,Ill. K4 | 10.70 |
| Buffalo W12 | 10.70 |
| Johnstown,Pa. B2 | 10.70 |
| Minnequa,Colo. C10 | 10.825 |
| Monessen,Pa. P16 | 10.70 |
| Muncie,Ind. I-7 | 10.90 |
| Palmer,Mass. W12 | 11.00 |
| Pittsburg,Calif. C11 | 11.50 |
| Portsmouth,O. P12 | 10.70 |
| Roebling,N.J. R5 | 11.00 |
| SparrowsPt.,Md. B2 | 10.80 |
| Struthers,O. Y1 | 10.70 |

| ROPE WIRE | (A) |
|---|---|
| Bartonville,Ill. K4 | 10.55 |
| Buffalo W12 | 10.55 |
| Fostoria,O. S1 | 10.55 |
| Johnstown,Pa. B2 | 10.55 |
| Monessen,Pa. P16 | 10.55 |
| Muncie,Ind. I-7 | 10.75 |
| Palmer,Mass. W12 | 10.85 |
| Portsmouth,O. P12 | 10.55 |
| Roebling,N.J. R5 | 10.85 |
| SparrowsPt. B2 | 10.65 |
| Struthers,O. Y1 | 10.55 |
| Worcester,Mass. J4 | 10.85 |

(A) Plow and Mild Plow; add 0.25c for Improved Plow.

## WIRE
(Continued)

**WIRE, Tire Bead**

| | |
|---|---|
| Bartonville,Ill. K4 | 14.15 |
| Monessen,Pa. P16 | 14.20 |
| Roebling,N.J. R5 | 14.35 |

**WIRE, Cold-Rolled Flat**

| | |
|---|---|
| Anderson,Ind. G6 | 9.50 |
| Baltimore T6 | 9.80 |
| Boston T6 | 9.80 |
| Buffalo W12 | 9.50 |
| Cleveland A7 | 9.50 |
| Crawfordsville,Ind. M8 | 9.00 |
| Dover,O. G6 | 9.50 |
| Fostoria,O. S1 | 9.50 |
| FranklinPark,Ill. T6 | 9.60 |
| Kokomo,Ind. C16 | 9.50 |
| Massillon,O. R8 | 9.50 |
| Milwaukee C23 | 9.70 |
| Monessen,Pa. P16 | 9.50 |
| Pawtucket,R.I. N8 | 9.80 |
| Riverdale,Ill. A1 | 9.60 |
| Rome,N.Y. R6 | 9.50 |
| Trenton,N.J. R5 | 9.80 |
| Worcester A7, T6, W12 | 9.80 |

**NAIL, Stock**

| To Dealers & Mfrs. (7) | Col. |
|---|---|
| AlabamaCity,Ala. R2 | 152 |
| Aliquippa,Pa. J5 | 152 |
| Atlanta A11 | 154 |
| Bartonville,Ill. K4 | 154 |
| Chicago,Ill. W13 | 152 |
| Cleveland A9 | 157 |
| Crawfordsville,Ind. M8 | 154 |
| Donora,Pa. A7 | 152 |
| Duluth,Minn. A7 | 152 |
| Fairfield,Ala. T2 | 152 |
| Galveston,Tex. D7 | 157 |
| Houston,Tex. S5 | 157 |
| Jack'ville,Fla.(23) M8 | 162 |
| Johnstown,Pa. B2 | 152 |
| Joliet,Ill. A7 | 152 |
| KansasCity,Mo. S5 | 157 |
| Kokomo,Ind. C16 | 154 |
| Minnequa,Colo. C10 | 157 |
| Monessen,Pa. P7 | 152 |
| Pittsburg,Calif. C11 | 171 |
| Rankin,Pa. A7 | 152 |
| S.Chicago,Ill. R2 | 152 |
| SparrowsPt.,Md. B2 | 154 |
| Sterling,Ill.(1) N15 | 152 |
| Worcester,Mass. A7 | 158 |

**NAILS, CUT (100 lb keg)**

| To Dealers (23) | |
|---|---|
| Conshohocken,Pa. A3 | $9.05 |
| Wheeling,W.Va. W10 | 9.05 |

**STAPLES, Polished Stock**

| To Dealers & Mfrs. (7) | Col. |
|---|---|
| AlabamaCity,Ala. R2 | 152 |
| Aliquippa,Pa. J5 | 152 |
| Atlanta A11 | 154 |
| Bartonville,Ill. K4 | 154 |
| Crawfordsville,Ind. M8 | 154 |
| Donora,Pa. A7 | 152 |
| Duluth,Minn. A7 | 152 |
| Fairfield,Ala. T2 | 152 |
| Jack'ville,Fla.(23) M8 | 162 |
| Johnstown,Pa. B2 | 152 |
| Joliet,Ill. A7 | 152 |
| Kokomo,Ind. C16 | 154 |
| Minnequa,Colo. C10 | 157 |
| Monessen,Pa. P7 | 152 |
| Pittsburg,Calif. C11 | 171 |
| Rankin,Pa. A7 | 152 |
| S.Chicago,Ill. R2 | 152 |
| SparrowsPt.,Md. B2 | 154 |
| Sterling,Ill. (1) N15 | 152 |
| Worcester,Mass. A7 | 158 |

**TIE WIRE, Automatic Baler (14½ Ga.)(Per 97 lb Net Box)**

| Coil No. 3150 | |
|---|---|
| AlabamaCity,Ala. R2 | $9.45 |
| Bartonville,Ill. K4 | 9.45 |
| Buffalo W12 | 9.45 |
| Crawfordsville,Ind. M8 | 9.45 |
| Donora,Pa. A7 | 9.45 |
| Duluth,Minn. A7 | 9.45 |
| Jacksonville,Fla. M8 | 9.88 |
| Johnstown,Pa. B2 | 9.45 |
| Joliet,Ill. A7 | 9.45 |
| Kokomo,Ind. C16 | 9.45 |
| LosAngeles B3 | 10.24 |
| Minnequa,Colo. C10 | 9.60 |
| Pittsburg,Calif. C11 | 10.23 |
| S.Chicago,Ill. R2 | 9.45 |
| SparrowsPt.,Md. B2 | 9.55 |
| Sterling,Ill. N15 | 9.35 |

| Coil No. 6500 Stand. | |
|---|---|
| AlabamaCity,Ala. R2 | $9.75 |
| Bartonville,Ill. K4 | 9.75 |
| Buffalo W12 | 9.75 |
| Crawfordsville,Ind. M8 | 9.75 |
| Donora,Pa. A7 | 9.75 |
| Duluth,Minn. A7 | 9.75 |
| Jacksonville,Fla. M8 | 10.18 |
| Johnstown,Pa. B3 | 9.75 |
| Joliet,Ill. A7 | 9.75 |
| Kokomo,Ind. C16 | 9.75 |
| LosAngeles B3 | 10.65 |
| Minnequa,Colo. C10 | 9.90 |
| Pittsburg,Calif. C11 | 10.55 |
| S.Chicago,Ill. R2 | 9.75 |
| SparrowsPt.,Md. B2 | 9.85 |
| Sterling,Ill. N15 | 9.65 |

| Coil No. 6500 Interim | |
|---|---|
| AlabamaCity,Ala. R2 | $9.80 |
| Bartonville,Ill. K4 | 9.80 |
| Buffalo W12 | 9.80 |
| Crawfordsville,Ind. M8 | 9.80 |
| Donora,Pa. A7 | 9.80 |
| Duluth,Minn. A7 | 9.80 |
| Jacksonville,Fla. M8 | 10.23 |
| Johnstown,Pa. B2 | 9.80 |
| Joliet,Ill. A7 | 9.80 |
| Kokomo,Ind. C16 | 9.80 |
| LosAngeles B3 | 10.60 |
| Minnequa,Colo. C10 | 9.95 |
| Pittsburg,Calif. C11 | 10.60 |
| S.Chicago,Ill. R2 | 9.80 |
| SparrowsPt.,Md. B2 | 9.90 |
| Sterling,Ill. N15 | 9.70 |

**WIRE, Barbed**

| | Col. |
|---|---|
| AlabamaCity,Ala. R2 | 175** |
| Aliquippa,Pa. J5 | 172‡ |
| Atlanta A11 | 181 |
| Bartonville,Ill. K4 | 181 |
| Crawfordsville,Ind. M8 | 181 |
| Donora,Pa. A7 | 175† |
| Duluth,Minn. A7 | 175† |
| Fairfield,Ala. T2 | 175† |
| Houston,Tex. S5 | 180** |
| Jacksonville,Fla. M8 | 186 |
| Johnstown,Pa. B2 | 179* |
| Joliet,Ill. A7 | 175† |
| KansasCity,Mo. S5 | 180** |
| Kokomo,Ind. C16 | 177† |
| Minnequa,Colo. C10 | 180** |
| Monessen,Pa. P7 | 178†† |
| Pittsburg,Calif. C11 | 195† |
| Rankin,Pa. A7 | 175† |
| S.Chicago,Ill. R2 | 175** |
| S.SanFrancisco C10 | 195** |
| SparrowsPoint,Md. B2 | 181* |
| Sterling,Ill.(1) N15 | 179†† |

**WOVEN FENCE, 9-15 ga. Col.**

| | |
|---|---|
| Ala.City,Ala. R2 | 162** |
| Ala.City, 17 ga. R2 | 257** |
| Aliq'ppa,Pa.9-14½ga J5 | 165‡ |
| Atlanta A11 | 168 |
| Bartonville,Ill. K4 | 168 |
| Crawfordsville,Ind. M8 | 168 |
| Donora,Pa. A7 | 162† |
| Duluth,Minn. A7 | 162† |
| Fairfield,Ala. T2 | 162† |
| Houston,Tex. S5 | 167** |
| Jacksonville,Fla. M8 | 173 |
| Johnstown,Pa. (43) B2 | 166 |
| Joliet,Ill. A7 | 162† |
| KansasCity,Mo. S5 | 167** |
| Kokomo,Ind. C16 | 164† |
| Minnequa,Colo. C10 | 167** |
| Monessen,Pa. 9 ga. P17 | 166†† |
| Pittsburg,Calif. C11 | 185† |
| Rankin,Pa. A7 | 162† |
| S.Chicago,Ill. R2 | 162** |
| Sterling,Ill.(1) N15 | 166†† |

| WIRE (16 Gage) | An'id Galv. Stone | Stone |
|---|---|---|
| Ala.City R2 | 14.50 | 16.05** |
| Bartonville K4 | 14.50 | 16.55 |
| Buffalo W12 | 14.50 | |
| Cleveland A7 | 14.50 | |
| Crawf'dsville M8 | 14.60 | 16.55 |
| Fostoria,O. S1 | 14.60 | 16.15† |
| Jacksonville M8 | 14.85 | 16.80 |
| Johnstown B2 | 14.50 | 16.40* |
| Kokomo C16 | 14.60 | 16.15† |
| Minnequa C10 | 14.75 | 16.45** |
| Palmer,MassW12 | 14.50 | 16.05* |
| Pitts.,Calif. C11 | 14.85 | 16.40† |
| S.Chicago R2 | 14.50 | 16.05** |
| SparrowsPt. B2 | 14.60 | 16.50* |
| Sterling(1) N15 | 14.50 | 16.45†† |
| Waukegan A7 | 14.50 | 16.05 |
| Worcester A7 | 14.60 | |

**WIRE, Merchant Quality**

| (6 to 8 gage) | An'id Galv. |
|---|---|
| Ala.City,Ala. R2 | 7.50 7.90** |
| Aliquippa J5 | 7.40 7.925‡ |
| Atlanta A11 | 7.60 8.20 |
| Bartonville(48) K4 | 7.60 8.20 |
| Buffalo W12 | 7.50 7.90† |
| Cleveland A7 | 7.50 |
| Crawfordsville M8 | 7.50 8.10 |
| Donora,Pa. A7 | 7.50 7.90† |
| Duluth,Minn. A7 | 7.50 7.90† |
| Fairfield T2 | 7.50 7.90† |
| Houston(48) S5 | 7.65 8.05** |
| Jacks'ville,Fla.M8 | 7.75 8.35 |
| Johnstown B2(48) | 7.50 8.10* |
| Joliet,Ill. A7 | 7.50 7.90† |
| Kans.City(48) | S5.7.65 8.05** |
| Kokomo C16 | 7.50 7.90† |
| LosAngeles B3 | 8.45 9.05* |
| Minnequa C10 | 7.65 8.05** |
| Monessen P7(48) | 7.40 8.00†† |
| Palmer,Mass. W12 | 7.80 8.20† |
| Pitts.,Calif. C11 | 8.45 8.85† |
| Portsmouth,O. P12 | 7.50 |
| Rankin A7 | 7.50 7.90† |
| S.Chicago R2 | 7.50 7.90** |
| S.SanFran. C10 | 8.35 8.75** |
| Spar'waPt. B2(48) | 7.60 8.20* |
| Str'ng(1)(48) | N15 7.40 8.00†† |
| Struth'rs,O.(48) | Y1 7.50 8.00‡ |
| Worcester,Mass.A7 | 7.80 8.20† |

Based on zinc price of: *13.5¢c. †5c. ‡10c. ‖Less than 10c. ††12c. **Subject to zinc equalization extras.

## FASTENERS

(Base discounts, full case quantity, per cent off list to consumer, f.o.b. mill)

**Carriage, Machine Bolts**

| Full-Size Body (cut thread) | |
|---|---|
| †¼" x 6" and smaller | 61 |
| Larger than ½" diam. and all diams. longer than 6" | 55 |
| Under-Size Body (rolled thread; not nutted): | |
| ⅛" x 6" and smaller | 61 |

†⅛" x 4" and smaller and shorter are not nutted.

**NUTS**

| | |
|---|---|
| **Reg. & Heavy Square Nuts:** | |
| All sizes | 61 |
| **H.P. Reg. & Heavy Hex Nuts:** | |
| ⅝" & smaller | 64 |
| ⅝" to 1¼" incl. | 63 |
| 1⅛" to 1½" incl. | 60 |
| 1⅝" & larger | 61 |
| **C.P. Reg. & Heavy Hex Nuts** | |
| ⅝" & smaller | 64 |
| ⅝" & larger | 61 |
| **Semifinished & Finished Nuts** | |
| ⅝" & smaller | 66 |
| ⅝" & larger | 63 |
| **Semifinished Slotted Reg. & Heavy Hex Nuts** | |
| ⅝" & smaller | 68 |
| ⅝" & larger | 63 |
| **Hot Galvanized Nuts, all types** | |
| 1½" & smaller | 44 |

(On above items, add 25% for less than case quantities)

**CAP SCREWS**
(New Std., hexagon head, upset, packages)

| | |
|---|---|
| **Bright:** | |
| 6" and shorter: | |
| ¼" through ⅝" diam. | 34 |
| ¾" & ⅞" diam. | 31 |
| 1", 1⅛", 1" | 8 |
| Longer than 6": | |
| ¼" through ⅝" diam. | 2 |
| ¾" through 1" diam. | +13 |
| **High Carbon, Heat-treated:** | |
| 6" and shorter: | |
| ¼" through ⅝" diam. | 20 |
| ¾" & ⅞" diam. | 18 |
| 1", 1⅛", 1" | +11 |
| Longer than 6": | |
| ¼" through ⅝" diam. | +23 |
| ¾" through 1" diam. | +41 |

(New Std. Hexagon head, upset, bulk)

| | |
|---|---|
| **Bright:** | |
| ⅛" x 6" & smaller & shorter | 49 |
| ¼", ⅜", ⅝" diam. x 6" & shorter | 48 |
| ⅞", 1⅛", 1" x 6" & shorter | 31 |
| **High Carbon, Heat-treated:** | |
| ⅛" x 6" & smaller & shorter | 41 |
| ¼" x ⅝" diam. & 6" & shorter | 39 |
| ⅞", 1⅛", 1" x 6" & shorter | 20 |

**MACHINE SCREW NUTS & STOVE BOLT NUTS (Bulk)**

| | |
|---|---|
| No. 2 to ⅝" incl., Square: | |
| 25,000 to 199,999 pieces | 20 |
| 200,000 or more pieces | 27 |
| No. 2 to ⅝" incl., Hex.: | |
| 25,000 to 199,999 pieces | 18 |
| 200,000 or more pieces | 25 |

**MACHINE SCREWS, SLOTTED (Bulk)**

| | |
|---|---|
| No. 2 to ¼" diam. incl.: | |
| 25,000 to 199,999 pieces | 20 |
| 200,000 or more pieces | 27 |
| ¼" to ½" diam. incl.: | |
| 15,000 to 99,999 pieces | 20 |
| 100,000 or more | 27 |

## BOILER TUBES

Net base c.l. prices, dollars per 100 ft, mill; minimum wall thickness, cut lengths 10 to 24 ft, inclusive.

| O.D. In. | B.W. Gage | Seamless H.R. | Seamless C.D. | Elec. Weld H.R. |
|---|---|---|---|---|
| 1 | 13 | .... | 21.55 | 20.42 |
| 1¼ | 13 | .... | 25.53 | 20.45 |
| 1½ | 13 | 24.34 | 28.22 | 22.61 |
| 1⅝ | 13 | 28.63 | 33.34 | 26.71 |
| 2 | 13 | 32.09 | 37.37 | 29.93 |
| 2¼ | 13 | 36.14 | 42.09 | 33.72 |
| 2½ | 12 | 39.23 | 45.67 | 36.60 |
| 2½ | 12 | 43.28 | 50.31 | 40.31 |
| 2⅝ | 12 | 46.79 | 54.48 | 43.65 |
| 3 | 12 | 49.90 | 58.10 | 46.55 |

## RAILWAY MATERIALS

| | Standard No. 1 | Standard No. 2 | Tee Rails All No. 2 | Tee Rails 60 lb Under |
|---|---|---|---|---|
| **RAILS** | | | | |
| Bessemer,Pa. U8 | 4.725 | 4.625 | 4.675 | 5.65 |
| Ensley,Ala. T2 | 4.725 | 4.625 | .... | 5.65 |
| Fairfield,Ala. T2 | .... | .... | .... | 5.65 |
| Gary,Ind. U8 | 4.725 | 4.625 | 4.675 | .... |
| Huntington,W.Va. W7 | .... | .... | .... | 5.65 |
| IndianaHarbor,Ind. I-2 | 4.725 | 4.625 | 4.675 | .... |
| Johnstown,Pa. B2 | .... | .... | ...(16) | 5.65 |
| Lackawanna,N.Y. B2 | 4.725 | 4.625 | ...(18) | 5.65 |
| Minnequa,Colo. C10 | 4.725 | 4.625 | .... | 6.15 |
| Steelton,Pa. B2 | 4.725 | 4.625 | .... | .... |
| Williamsport,Pa. S19 | .... | .... | .... | 5.65 |

**TIE PLATES**

| | |
|---|---|
| Fairfield,Ala. T2 | 5.625 |
| Gary,Ind. U8 | 5.625 |
| Ind.Harbor,Ind. I-2 | 5.625 |
| Lackawanna,N.Y. B2 | 5.625 |
| Minnequa,Colo. C10 | 5.625 |
| Seattle B3 | 5.775 |
| Steelton,Pa. B2 | 5.625 |
| Torrance,Calif. C11 | 5.775 |

**TRACK BOLTS, Untreated**

| | |
|---|---|
| Cleveland R2 | 12.15 |
| KansasCity,Mo. S5 | 12.90* |
| Lebanon,Pa. B2 | 12.15 |
| Minnequa,Colo. C10 | 12.15 |
| Pittsburgh O3, P14 | 12.15 |
| Seattle B3 | 12.65 |

*Treated

**AXLES**

| | |
|---|---|
| Ind.Harbor,Ind. S13 | 7.50 |
| Johnstown,Pa. B2 | 7.50 |

| | |
|---|---|
| Bessemer,Pa. U8 | 5.825 |
| Fairfield,Ala. T2 | 5.825 |
| Ind.Harbor,Ind. I-2 | 5.825 |
| Joliet,Ill. U8 | 5.825 |
| Lackawanna,N.Y. B2 | 5.825 |
| Minnequa,Colo. C10 | 5.825 |
| Steelton,Pa. B2 | 5.825 |

**SCREW SPIKES**

| | |
|---|---|
| Cleveland R2 | 11.90 |
| Pittsburgh O3 | 11.90 |

**STANDARD TRACK SPIKES**

| | |
|---|---|
| Fairfield,Ala. T2 | 8.05 |
| Ind.Harbor,Ind. Y1 | 8.05 |
| Ind.Harbor,Ind. I-2 | 7.90 |
| KansasCity,Mo. S5 | 7.90 |
| Lebanon,Pa. B2 | 8.05 |
| Minnequa,Colo. C10 | 7.90 |
| Pittsburgh J5 | 8.05 |
| Seattle B3 | 8.55 |
| S.Chicago,Ill. R2 | 8.05 |
| Struthers,O. Y1 | 8.05 |
| Youngstown R2 | 8.05 |

## METAL POWDER

(Per pound f.o.b. shipping point in ton lots for minus 100 mesh, except as noted)

| | |
|---|---|
| Sponge iron: | Cents |
| 98+% Fe, annealed | 9.25 |
| Swedish, c.l.f., Camden, N. J., c.l. in bags | 9.50 |
| Domestic: | |
| F.o.b. Johnstown, Pa., Niagara Falls, N. Y., in bags | 9.50 |
| F.o.b. Riverton, N. J., in bags | 8.50 |
| Canadian, f.o.b. shipping point | 9.50 |
| Electrolytic iron: | |
| Melting stock, 99.9% Fe, irregular fragments of ⅛ in. x 1.3 in. | 22.00 |
| Annealed, 99.5% Fe | 36.50 |
| Unannealed (99+% Fe) | 34.00 |
| Unannealed (99+% Fe) (minus 325 mesh) | 57.00 |
| Powder Flakes (minus 16, plus 100 mesh) | 31.00 |
| Carbonyl Iron: | |
| 98.1-99.9%, 3 to 20 microns, depending on grade, $6.00-275.00, in standard 200-lb containers; all minus 200 mesh. | |
| Aluminum: | |
| Atomized, 500 lb, drum frght. allowed | |
| Carlots | 34.50 |
| Ton lots | 36.50 |
| Antimony, 500 lb lots | 32.00* |
| Brass, 5000-lb lots | 41.75-65.25† |
| Bronze, 5000-lb lots | 67.50-71.75† |
| Copper: | |
| Electrolytic | 14.25* |
| Reduced | 14.25* |
| Lead | 7.50* |
| Manganese: | |
| Minus 35 mesh | 64.00 |
| Minus 100 mesh | 70.00 |
| Minus 200 mesh | 75.00 |
| Nickel, unannealed | $1.00 |
| Nickel-Silver, 5000-lb lots | 62.75-65.25† |
| Phosphor-Copper, 5000-lb lots | 68.75 |
| Silicon | 47.50 |
| Solder | 7.00* |
| Stainless Steel, 302 | 99.00 |
| Stainless Steel, 316 | $1.52 |
| Tin | 14.50* |
| Zinc 5000-lb lots | 19.25-33.00‡ |
| Tungsten | Dollars |
| Melting grade, 99% 60 to 200 mesh: | |
| 1000 lb and over | 4.50 |
| Less than 1000 lb | 4.65 |
| Chromium, electrolytic 99.8% Cr min. metallic basis | 5.00 |

*Plus cost of metal. †Depending on composition. ‡Depending on mesh. §70% Cu, 30% Zn, 10% Ni. **64% Cu, 18% Zn, 18% Ni.

## Footnotes

(1) Chicago base.
(2) Angles, flats, bands.
(3) Merchant.
(4) Reinforcing.
(5) 1¼-in. to less than 1 7/16-in.
(6) Chicago or Birm. base.
(7) To jobbers, 3 cols. lower.
(8) 16 Ga. and heavier.
(9) Merchant quality; add 0.35c for special quality.
(10) Pittsburgh base.
(11) Cleveland & Pitts. base.
(12) Worcester, Mass. base.
(13) Add 0.25c for 17 Ga. & heavier.
(14) Gage 0.143 to 0.249 in.; for gage 0.142 and lighter, 5.50c.
(15) ⅝" and thinner.
(16) 40 lb and under.
(17) Flats only; 0.25 in. & heavier.
(18) To dealers.
(19) Chicago & Pitts. base.
(21) New Haven, Conn., base.
(22) Dedd. San Francisco Bay area.
(23) Plus 4c per 100 lb.
(24) Deduct 0.10c, finer than 15 Ga.
(25) Bar mill bands
(26) Delivered in mill zone, 5.25c.
(27) Bar mill sizes.
(28) Bonderized.
(29) Youngstown base.
(30) Sheared; for universal mill add 0.45c.
(31) Widths over ⅝-in.; 6.90c for widths ⅝-in and under by 0.125 in. and thinner.
(32) Buffalo base.
(33) To jobbers, deduct 20c.
(34) 9.60c for cut lengths.
(35) 72" and narrower.
(36) 54" and narrower.
(37) 13 Ga. & heavier; 60" & narrower.
(38) 14 Ga. & Lighter; 48" & narrower.
(39) 48" and narrower.
(40) Lighter than 0.035"; 0.035" and heavier, 0.25c higher.
(41) 9 15c for cut lengths.
(42) Mill lengths, f.o.b. mill; deld. in mill zone or within switching limits, 5.25c.
(43) 9-14½ Ga.
(48) 6-7 Ga.
(49) 2½ in. and smaller rounds; 7.95c over 2½ in. and other shapes.

## SEAMLESS STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

| Size—Inches | 2 | | 2½ | | 3 | | 3½ | | 4 | | 5 | | 6 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| List Per Ft | 37c | | 58.5c | | 76.5c | | 92c | | $1.09 | | $1.48 | | $1.92 | |
| Pounds Per Ft | 3.68 | | 5.82 | | 7.62 | | 9.20 | | 10.89 | | 14.81 | | 19.18 | |
| | Blk | Galv* | Blk | Galv* | Blk | Galv* | Blk | Galv* | Blk | Galv* | Blk | Galv* | Blk | Galv* |
| Aliquippa, Pa. J5 | 4 | +14 | 10.5 | +8.25 | 13 | +5.75 | 14.5 | +4.25 | 14.5 | +4.25 | 14 | +4.75 | 16.5 | +2.25 |
| Ambridge, Pa. N2 | 4 | .... | 10.5 | .... | 13 | .... | 14.5 | .... | 14.5 | .... | 14 | .... | 16.5 | .... |
| Lorain, O. N3 | 4 | +14 | 10.5 | +8.25 | 13 | +5.75 | 14.5 | +4.25 | 14.5 | +4.25 | 14 | +4.75 | 16.5 | +2.25 |
| Youngstown Y1 | 6.5 | +11.5 | 10.5 | +8.25 | 13 | +5.75 | 14.5 | +4.25 | 14.5 | +4.25 | 14 | +4.75 | 16.5 | +2.25 |

## ELECTRIC WELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Youngstown R2 | 6.5 | +11.5 | 10.5 | +8.25 | 13 | +5.75 | 14.5 | +4.25 | 14.5 | +4.25 | 14 | +4.75 | 16.5 | +2.25 |

## BUTTWELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

| Size—Inches | ⅛ | | ¼ | | ⅜ | | ½ | | ¾ | | 1 | | 1¼ | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| List Per Ft | 5.5c | | 6c | | 8c | | 8.5c | | 11.5c | | 17c | | 23c | |
| Pounds Per Ft | 0.24 | | 0.42 | | 0.57 | | 0.85 | | 1.13 | | 1.68 | | 2.28 | |
| | Blk | Galv* | Blk | Galv* | Blk | Galv* | Blk | Galv* | Blk | Galv* | Blk | Galv* | Blk | Galv* |
| Aliquippa, Pa. J5 | .... | .... | .... | .... | .... | .... | 16.5 | +0.75 | 21.5 | 3.25 | 24 | 6.75 | 26.5 | 8.5 |
| Alton, Ill. L1 | .... | .... | .... | .... | .... | .... | 16.5 | +2.75 | 19.5 | 1.25 | 22 | 4.75 | 24.5 | 6.5 |
| Benwood, W. Va. W10 | 17.5 | +13 | 9 | +16.5 | +0.75 | +28.5 | 18.5 | +0.75 | 21.5 | 3.25 | 24 | 6.75 | 26.5 | 8.5 |
| Butler, Pa. F6 | 15 | +12.5 | 9.5 | +18 | 1.5 | +26 | .... | .... | .... | .... | .... | .... | .... | .... |
| Etna, Pa. N2 | .... | .... | .... | .... | .... | .... | 18.5 | +0.75 | 21.5 | 3.25 | 24 | 6.75 | 26.5 | 8.5 |
| Fairless, Pa. N3 | .... | .... | .... | .... | .... | .... | 16.5 | +2.75 | 19.5 | 1.25 | 22 | 4.75 | 24.5 | 6.5 |
| Fontana, Calif. K1 | .... | .... | .... | .... | .... | .... | 6 | +13.25 | 9 | +9.25 | 11.5 | +5.75 | 14 | +4 |
| Ind. Harbor, Ind. Y1 | .... | .... | .... | .... | .... | .... | 17.5 | +1.75 | 20.5 | 2.25 | 23 | 5.75 | 25.5 | 7.5 |
| Lorain, O. N3 | .... | .... | .... | .... | .... | .... | 18.5 | +0.75 | 21.5 | 3.25 | 24 | 6.75 | 26.5 | 8.5 |
| Sharon, Pa. S4 | 15 | +12.5 | 9.5 | +18 | 1.5 | +26 | .... | .... | .... | .... | .... | .... | .... | .... |
| Sharon, Pa. M8 | .... | .... | .... | .... | .... | .... | 18.5 | +0.75 | 21.5 | 3.25 | 24 | 6.75 | 26.5 | 8.5 |
| Sparrows Pt., Md. B2 | 16 | +12.5 | 7.5 | +18 | +0.5 | +25 | 16.5 | +0.75 | 19.5 | 3.25 | 22 | 6.75 | 24.5 | 8 |
| Youngstown R2, Y1 | .... | .... | .... | .... | .... | .... | 18.5 | +0.75 | 21.5 | 3.25 | 24 | 6.75 | 26.5 | 8.5 |
| Wheatland, Pa. W9 | 15 | +12.5 | 9.5 | +18 | 1.5 | +26 | 18.5 | +0.75 | 21.5 | 3.25 | 24 | 6.75 | 26.5 | 8.5 |

| Size—Inches | 1¼ | | 2 | | 2½ | | 3 | | 3½ | | 4 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| List Per Ft | 27.5c | | 37c | | 58.5c | | 76.5c | | 92c | | $1.09 | |
| Pounds Per Ft | 2.73 | | 3.68 | | 5.82 | | 7.62 | | 9.20 | | 10.89 | |
| | Blk | Galv* | Blk | Galv* | Blk | Galv* | Blk | Galv* | Blk | Galv* | Blk | Galv* |
| Aliquippa, Pa. J5 | 27 | 9.5 | 27.5 | 10 | 29 | 10.75 | 29 | 10.75 | .... | .... | .... | .... |
| Alton, Ill. L1 | 25 | 7.5 | 25.5 | 8 | 27 | 8.75 | 27 | 8.75 | .... | .... | .... | .... |
| Benwood, W. Va. W10 | 27 | 9.5 | 27.5 | 10 | 29 | 10.75 | 29 | 10.75 | 19.5 | 0.75 | 19.5 | 0.75 |
| Etna, Pa. N2 | 27 | 9.5 | 27.5 | 10 | 29 | 10.75 | 29 | 10.75 | 19.5 | 0.75 | 19.5 | 0.75 |
| Fairless, Pa. N3 | 25 | 7.5 | 25.5 | 8 | 27 | 8.75 | 27 | 8.75 | 17.5 | +1.25 | 17.5 | +1.25 |
| Fontana, Calif. K1 | 14.5 | +3 | 15 | +2.5 | 16.5 | +1.75 | 16.5 | +1.75 | 7 | +11.75 | 7 | +11.75 |
| Ind. Harbor, Ind. Y1 | 26 | 8.5 | 26.5 | 9 | 28 | 9.75 | 28 | 9.75 | 18.5 | +0.25 | 18.5 | +0.25 |
| Lorain, O. N3 | 27 | 9.5 | 27.5 | 10 | 29 | 10.75 | 29 | 10.75 | .... | .... | .... | .... |
| Sharon, Pa. M6 | 27 | 9.5 | 27.5 | 10 | 29 | 10.75 | 29 | 10.75 | .... | .... | .... | .... |
| Sparrows Pt., Md. B2 | 25 | 9 | 25.5 | 9.5 | 27 | 9.75 | 27 | 9.75 | 17.5 | +0.25 | 17.5 | +0.25 |
| Wheatland, Pa. W9 | 27 | 9.5 | 27.5 | 10 | 29 | 10.75 | 29 | 10.75 | 19.5 | 0.75 | 19.5 | 0.75 |
| Youngstown R2, Y1 | 27 | 9.5 | 27.5 | 10 | 29 | 10.75 | 29 | 10.75 | 19.5 | 0.75 | 19.5 | 0.75 |

*Galvanized pipe discounts based on current price of zinc (13.5Sc, East St. Louis).

# Stainless Steel

Representative prices, cents per pound; subject to current lists of extras

| AISI Type | Rerolling Ingot | Rerolling Slabs | Forging Billets | Seamless Tube Billets | H.R. Strip | Wire Rods; C.F. Wire | Bars; Structural Shapes | Plates | Sheets | C.R. Strip; Flat Wire |
|---|---|---|---|---|---|---|---|---|---|---|
| 201 | 18.50 | 23.00 | .... | .... | 31.00 | .... | .... | .... | 42.25 | 39.00 |
| 202 | 19.75 | 25.50 | 31.00 | 36.25 | 33.50 | .... | 36.75 | 38.75 | 42.50 | 42.50 |
| 301 | 19.25 | 23.75 | .... | 36.75 | 32.00 | 36.00 | 38.00 | .... | 44.25 | 41.00 |
| 302 | 20.50 | 26.25 | 32.00 | 37.25 | 34.50 | 36.25 | 38.25 | 40.25 | 44.50 | 44.50 |
| 302B | 20.25 | 26.50 | 33.00 | 37.25 | 37.75 | 36.25 | 38.25 | 40.25 | 47.00 | 47.00 |
| 303 | .... | 26.75 | 34.75 | 40.00 | .... | 39.00 | 41.00 | .... | .... | .... |
| 304 | 21.75 | 27.50 | 33.75 | 39.00 | 37.25 | 38.25 | 40.25 | 43.00 | 47.25 | 47.25 |
| 304L | .... | .... | 36.75 | 44.00 | 42.25 | 43.25 | 45.25 | 48.00 | 52.25 | 52.25 |
| 305 | 23.25 | 30.25 | .... | 39.50 | 40.25 | 38.25 | 40.25 | 43.50 | 50.25 | 50.25 |
| 308 | 23.50 | 30.50 | 38.50 | 44.25 | 41.25 | 43.25 | 45.50 | 49.75 | 52.00 | 52.00 |
| 309 | 31.00 | 39.75 | 46.75 | 53.50 | 53.50 | 52.00 | 54.75 | 58.25 | 67.00 | 67.00 |
| 310 | 37.25 | 48.00 | 62.25 | 72.25 | 68.50 | 69.75 | 73.50 | 75.25 | 78.75 | 78.75 |
| 314 | .... | .... | .... | .... | .... | 69.75 | .... | 75.25 | .... | .... |
| 316 | 31.50 | 40.25 | 51.25 | 59.50 | 58.25 | 57.75 | 60.75 | 64.00 | 68.25 | 68.25 |
| 316L | .... | .... | 56.25 | 64.50 | 63.25 | 62.75 | 65.75 | 69.00 | 73.25 | 73.25 |
| 317 | 37.25 | 48.25 | 62.75 | 72.75 | 75.50 | 70.75 | 74.50 | 77.00 | 83.75 | 83.75 |
| 321 | 25.00 | 32.00 | 38.25 | 44.00 | 44.25 | 43.00 | 45.25 | 49.25 | 54.25 | 54.25 |
| 18-8CbTa | 29.25 | 38.00 | 45.75 | 52.25 | 53.25 | 50.75 | 53.50 | 58.00 | 66.50 | 66.50 |
| 403 | .... | .... | 28.75 | 32.75 | .... | 32.25 | 34.00 | 36.25 | .... | .... |
| 405 | 17.50 | 23.00 | 26.75 | 31.00 | 32.25 | 30.50 | 32.00 | 33.75 | 42.25 | 42.25 |
| 410 | 15.00 | 19.50 | 25.50 | 29.50 | 28.00 | 29.00 | 30.50 | 31.75 | 36.25 | 36.25 |
| 416 | .... | .... | 26.00 | 30.00 | .... | 29.50 | 31.00 | .... | .... | .... |
| 420 | .... | 30.25 | 31.00 | 36.00 | 37.75 | 35.50 | 37.25 | 40.75 | 56.00 | 56.00 |
| 430 | 15.25 | 19.75 | 26.00 | 30.00 | 28.75 | 28.50 | 31.00 | 32.25 | 34.50 | 36.75 |
| 430F | .... | .... | 26.50 | 30.50 | .... | 30.00 | 31.50 | .... | .... | .... |
| 431 | .... | 25.50 | 33.25 | .... | .... | 37.25 | 39.25 | 40.75 | .... | .... |
| 446 | .... | .... | 35.50 | 40.50 | 53.25 | 40.00 | 42.00 | 43.25 | 63.25 | 63.25 |

Stainless Steel Producers Are: Allegheny Ludlum Steel Corp.; Alloy Metal Wire Co. Inc.; Alloy Tube Div., Carpenter Steel Co.; American Steel & Wire Div., U. S. Steel Corp.; Armco Steel Corp.; Babcock & Wilcox Co.; Bethlehem Steel Co.; J. Bishop & Co.; G. O. Carlson Inc.; Carpenter Steel Co.; Charter Wire Products Co.; Cold Metal Products Co.; Crucible Steel Co. of America; Damascus Tube Co.; Wilbur B. Driver Co.; Driver-Harris Co.; Eastern Stainless Steel Corp.; Ellwood Ivins Steel Tube Works Inc.; Firth Sterling Inc.; Ft. Wayne Metals Inc.; Globe Steel Tubes Co.; Helical Tube Co.; Indiana Steel & Wire Co.; Ingersoll Steel Div., Borg-Warner Corp.; Jessop Steel Co.; Johnson Steel & Wire Co. Inc.; Joslyn Mfg. & Supply Co.; Kenmore Metals Corp.; Maryland Fine & Specialty Wire Co.; McLouth Steel Corp.; Metal Forming Corp.; McInnes Steel Co.; National-Standard Co.; National Tube Div., U. S. Steel Corp.; Newman-Crosby Steel Co.; Pacific Tube Co.; Page Steel & Tube Div., American Chain & Cable Co. Inc.; Pittsburgh Rolling Mills Inc.; Republic Steel Corp.; Rodney Metals Inc.; Rome Mfg. Co.; Rotary Electric Steel Co.; Sharon Steel Corp.; Sawhill Tubular Products Inc.; Simonds Saw & Steel Co.; Specialty Wire Co. Inc.; Spencer Wire Corp.; Stainless Welded Products Inc.; Standard Tube Co.; Superior Steel Corp., Superior Tube Co.; Timken Roller Bearing Co.; Trent Tube Co.; Tube Methods Inc.; Ulbrich Stainless Steels; United States Steel Corp.; Universal-Cyclops Steel Co.; Wallingford Steel Co.; Washington Steel Corp.

# Clad Steel

| | Plates, Carbon Base 10% | Plates, Carbon Base 20% | Sheets, Carbon Base 20% |
|---|---|---|---|
| 302 | .... | .... | 30.50 |
| 304 | 30.30 | 36.05 | 32.50 |
| 304-L | 32.30 | 37.95 | .... |
| 310 | 41.30 | 47.00 | .... |
| 316 | 35.50 | 41.40 | 47.00 |
| 316-L | 40.00 | 46.10 | .... |
| 316-CB | 41.15 | 48.45 | .... |
| 321 | 32.00 | 37.75 | 37.25 |
| 347 | 34.40 | 41.40 | 48.25 |
| 405 | 25.80 | 33.35 | .... |
| 410 | 25.30 | 32.85 | .... |
| 430 | 25.30 | 32.85 | .... |
| Inconel | 49.45 | 65.45 | .... |
| Nickel | 41.05 | 55.65 | .... |
| Nickel, Low Carbon | 43.25 | 60.05 | .... |
| Monel | 42.35 | 56.35 | .... |
| Copper* | .... | .... | 46.60 |

| | Strip, Carbon Base, Cold Rolled 10% | Strip, Carbon Base, Cold Rolled Both Sides |
|---|---|---|
| Copper* | 33.75 | 42.75 |

*Deoxidized. Production points: Stainless-clad sheets, New Castle, Ind. I-4; stainless-clad plates, Claymont, Del. C22, Contesville, Pa. L7, New Castle, Ind. I-4 and Washington, Pa. J3; nickel, inconel, monel-clad plates, Coatesville L7; copper-clad strip, Carnegie, Pa. S18.

# Tool Steel

| Grade | $ per lb | Grade | $ per lb |
|---|---|---|---|
| Regular Carbon | 0.275 | 5% Cr Hot Work | 0.420-0.460 |
| Extra Carbon | 0.330 | W-Cr Hot Work | 0.450 |
| Special Carbon | 0.390 | V-Cr Hot Work | 0.470 |
| Oil Hardening | 0.430 | Hi-Carbon-Cr | 0.770 |

Grade by Analysis (%)

| W | Cr | V | Co | Mo | $ per lb |
|---|---|---|---|---|---|
| 20.25 | 4.25 | 1.6 | 12.25 | ... | 4.090 |
| 18.25 | 4.25 | 1 | 4.75 | ... | 2.305-2.475 |
| 18 | 4 | 2 | 9 | ... | 2.675-2.775 |
| 18 | 4 | 2 | .... | ... | 1.765 |
| 18 | 4 | 1 | .... | ... | 1.600 |
| 13.75 | 3.75 | 2 | 5 | ... | 2.245 |
| 13.5 | 4 | 3 | .... | ... | 1.845 |
| 9 | 3.5 | .. | .... | ... | 1.180 |
| 6 | 4 | 2 | .... | 5 | 1.105 |
| 6 | 4 | 3 | .... | 6 | 1.350 |
| 1.5 | 4 | 1 | .... | 8.5 | 0.960 |

Tool steel producers include: A4, A8, B2, B8, C4, C9, C13, C18, D4, F2, J3, M14, S8, U4, V2 and V3.

# Pig Iron

F.o.b. furnace prices in dollars per gross ton, as reported to STEEL. Minimum delivered prices are approximate and do not include 3% federal tax.

| *Birmingham District* | Basic | No. 2 Foundry | Malleable | Bessemer |
|---|---|---|---|---|
| AlabamaCity,Ala. R2 | 54.50 | .... | .... | .... |
| Birmingham R2 | 54.50 | 55.00‡ | .... | .... |
| Birmingham U6 | .... | 55.00‡ | 59.00 | .... |
| Woodward,Ala. W15 | 54.50 | 55.00‡ | 59.00 | .... |
| Cincinnati, deld. | .... | 62.70 | .... | .... |
| *Buffalo District* | | | | |
| Buffalo H1, R2 | 60.00 | 60.50 | 61.00 | 61.50 |
| Tonawanda,N.Y. W12 | 60.00 | 60.50 | 61.00 | 61.50 |
| N.Tonawanda,N.Y. T9 | .... | 60.50 | 61.00 | 61.50 |
| Boston, deld. | 70.65 | 71.15 | 71.65 | .... |
| Rochester,N.Y. deld. | 63.02 | 63.52 | 64.02 | .... |
| Syracuse,N.Y. deld. | 64.12 | 64.62 | 65.12 | .... |
| *Chicago District* | | | | |
| Chicago I-3 | 60.00 | 60.50 | 60.50 | 61.00 |
| Gary,Ind. U5 | 60.00 | .... | 60.50 | .... |
| S.Chicago R2 | 60.00 | .... | 60.50 | .... |
| S.Chicago,Ill. Y1 | 60.00 | 60.50 | 60.50 | 61.00 |
| S.Chicago,Ill. U5, W14 | 60.00 | .... | 60.50 | 61.00 |
| Milwaukee, deld. | 62.30 | 62.80 | 62.80 | 63.30 |
| Muskegon,Mich. deld. | .... | 67.18 | 67.18 | .... |
| *Cleveland District* | | | | |
| Cleveland R2, A7 | 60.00 | 60.50 | 60.50 | 61.00 |
| Akron,O. deld. | 62.75 | 63.25 | 63.25 | 63.75 |
| *Mid-Atlantic District* | | | | |
| Bethlehem,Pa. B2 | 62.00 | 62.50 | 63.00 | 63.50 |
| NewYork, deld. | .... | 66.51 | 67.01 | .... |
| Newark, deld. | 65.20 | 65.70 | 66.20 | 66.70 |
| Birdsboro,Pa. B10 | 62.00 | 62.50 | 63.00 | 63.50 |
| Chester,Pa. P14 | 62.00 | 62.50 | 63.00 | .... |
| Philadelphia, deld. | 63.76 | 64.28 | 64.78 | .... |
| Steelton,Pa. H2 | 62.00 | 62.50 | 63.00 | 63.50 |
| Swedeland,Pa. A3 | 62.00 | 62.50 | 63.00 | 63.50 |
| Philadelphia, deld. | 63.76 | 64.28 | 64.76 | 65.28 |
| Troy,NY. R2 | 62.00 | 62.50 | 63.00 | 63.50 |
| *Pittsburgh District* | | | | |
| Nevillelsland,Pa. P6 | 60.00 | 60.50 | 60.50 | .... |
| Pittsburgh (N&S sides), Aliquippa, deld. | .... | 61.95 | 61.95 | 62.48 |
| McKeesRock, deld. | .... | 61.60 | 61.60 | 62.13 |
| Lawrenceville, Homestead, Wilmerding,Monaca, deld. | .... | 62.26 | 62.26 | 62.79 |
| Verona,Trafford, deld. | 62.29 | 62.82 | 62.82 | 63.35 |
| Brackenridge, deld. | 62.00 | 63.10 | 63.10 | 63.63 |
| Bessemer Pa. U5 | 60.00 | .... | 60.50 | 61.00 |
| Clairton,Rankin,S.Duquesne,Pa. U5 | 60.00 | .... | .... | .... |
| Midland,Pa. C18 | 60.00 | .... | .... | .... |

| *Youngstown District* | Basic | No. 2 Foundry | Malleable | Bessemer |
|---|---|---|---|---|
| Hubbard,O. Y1 | .... | .... | 60.50 | .... |
| Sharpeville,Pa. S6 | 60.00 | .... | 60.50 | 61.00 |
| Youngstown Y1 | .... | .... | 60.50 | 61.00 |
| Youngstown U5 | 60.00 | .... | .... | 61.00 |
| Mansfield,O. deld. | 64.90 | .... | 65.40 | 65.90 |
| Duluth I-3 | 60.00 | 60.50 | 60.50 | 61.00 |
| Erie,Pa. I-3 | 60.00 | 60.50 | 60.50 | 61.00 |
| Everett,Mass. E1 | 62.00 | 62.50 | 63.00 | .... |
| Fontana,Calif. K1 | 67.50 | 68.00 | .... | .... |
| Geneva,Utah C11 | 60.00 | 60.50 | .... | .... |
| GraniteCity,Ill. G4 | 61.90 | 62.40 | 62.90 | .... |
| Ironton,Utah C11 | 60.00 | 60.50 | .... | .... |
| LoneStar,Texas L6 | .... | 55.00* | .... | .... |
| Minnequa,Colo. C10 | 62.00 | 62.50 | 63.00 | .... |
| Rockwood,Tenn. T3 | .... | 55.00‡ | 59.00 | .... |
| Toledo,O. I-3 | 60.00 | 60.50 | 60.50 | 61.00 |
| Cincinnati, deld. | 65.76 | 66.26 | .... | .... |

*Phos. 0.51-0.75%; $56, Phos. 0.31-0.50%.
‡Intermediate (Phos. 0.31-0.69%), $56.

## PIG IRON DIFFERENTIALS

*Silicon:* Add 50 cents per ton for each 0.25% Si or percentage thereof over base grade, 1.75-2.25%, except on low phos iron on which base is 1.75-2.00%.

*Manganese:* Add 50 cents per ton for each 0.50% manganese over 1% or portion thereof.

*Nickel:* Under 0.05% no extra; 0.50-0.74%, inclusive, add $3 per ton and each additional 0.25%, add $1 per ton.

## BLAST FURNACE SILVERY PIG IRON, Gross Ton

(Base 6.00-6.50% silicon; add $1.25 for each 0.5% Si; 75 cents for each 0.50% Mn over 1%)

| | |
|---|---|
| Jackson,O. G2, J1 | 69.00 |
| Buffalo H1 | 70.25 |

## ELECTRIC FURNACE SILVERY IRON, Gross Ton

(Base 14.01-14.50% silicon; add $1 for each 0.5% Si to 18%; $1 for each 0.50% Mn over 1%; $2 per gross ton premium for 0.045% max P)

| | |
|---|---|
| NiagaraFalls,N.Y. P15 | $92.50 |
| Keokuk,Iowa, Open-hearth & Fdry. (freight allowed K2) | 97.00 |
| Keokuk, O. H. & Fdry, 12½ lb piglets, 10% Si, frgt allowed K2 | 100.00 |

## LOW PHOSPHORUS PIG IRON, Gross Ton

| | |
|---|---|
| Lyles,Tenn. T3 (Phos. 0.035% max) | $72.50 |
| Rockwood,Tenn. T3 (Phos. 0.035% max) | 72.50 |
| Steelton,Pa. H2 (Phos. 0.035% max) | 68.00 |
| Philadelphia, deld. | 71.55 |
| Troy,N.Y. R2 (Phos. 0.035% max) | 68.00 |
| Cleveland A7 (Intermediate) (Phos. 0.036-0.075% max) | 65.00 |
| Duluth I-3 (Intermediate) (Phos. 0.036-0.075% max) | 65.00 |
| Erie,Pa. I-3 (Intermediate) (Phos. 0.036-0.075% max) | 65.00 |
| Nevillelsland,Pa. P6 (Intermediate) (Phos. 0.036-0.075% max) | 65.00 |

# Warehouse Steel Products

Representative prices, per pound, subject to extras, f.o.b. warehouse. City delivery charges are 15 cents per 100 lb except: St. Paul, 25 cents; Moline, Norfolk, Richmond, Washington, 20 cents; Baltimore, Boston, Los Angeles, New York, Philadelphia, Portland, San Francisco, 10 cents; Atlanta, Houston, Seattle, Spokane, no charge.

| | SHEETS | | | | STRIP | BARS | | | | Standard Structural Shapes | PLATES | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Hot-Rolled | Cold-Rolled | Gal. 10 Ga.† | Stainless Type 302 | Hot-Rolled* | H.R. Merchant Qual. | H.R. Spec. Qual. | C.F. Rds.§ | H.R. Alloy 4140‡‡[5] | | Carbon | Floor |
| Atlanta | 7.14 | 8.20 | 8.87 | .... | 7.40 | 7.42 | ... | 9.30 | .... | 7.63 | 7.49 | 9.45 |
| Baltimore | 7.24 | 8.35 | 8.50 | .... | 7.70 | 7.70 | ... | 8.45[3] | 14.30 | 7.94 | 7.56 | 9.02 |
| Birmingham | 7.13 | 8.24 | 8.85 | .... | 7.21 | 7.27 | 7.80 | 9.35 | .... | 7.43 | 7.45 | 9.50 |
| Boston | 8.12 | 9.07 | 10.32 | 83.32 | 8.21 | 8.21 | 8.76 | 9.73 | 13.56 | 8.27 | 8.41 | 9.84 |
| Buffalo | 7.20 | 8.25 | 10.01 | .... | 7.35 | 7.35 | 8.05 | 7.90 | 13.35 | 7.60 | 7.65 | 9.00 |
| Chattanooga | 7.28 | 8.44 | 8.60 | .... | 7.36 | 7.42 | 7.95 | 9.18 | .... | 7.63 | 7.60 | 9.32 |
| Chicago | 7.13 | 8.24 | 9.10 | 46.75 | 7.21 | 7.27 | 7.80 | 7.75 | 13.05 | 7.43 | 7.45 | 8.72 |
| Cincinnati | 7.25 | 8.23 | 9.10 | 46.10 | 7.45 | 7.51 | 8.04 | 8.15 | 13.29 | 7.90 | 7.74 | 8.97 |
| Cleveland | 7.13 | 8.24 | 8.95 | 49.16 | 7.31 | 7.33 | 7.86 | 8.00 | 13.11 | 7.76 | 7.62 | 8.89 |
| Denver | 8.95 | 10.31 | 11.73 | .... | 9.10 | 9.10 | ... | 9.82 | 17.87 | 8.95 | 9.10 | 10.50 |
| Detroit | 7.32 | 8.43 | 9.38 | 43.50 | 7.49 | 7.55 | 8.08 | 8.04 | 13.25 | 7.90 | 7.73 | 8.91 |
| Erie, Pa. | 7.08 | 8.24 | 8.95[10] | .... | 7.31 | 7.35 | ... | 8.10[10] | .... | 7.65 | 7.30 | 8.79 |
| Houston | 7.85 | 8.75 | 10.49 | .... | 8.15 | 8.25 | ... | 9.85 | 14.00 | 8.20 | 7.80 | 9.20 |
| Jackson, Miss. | 7.46 | 8.52 | 9.22 | .... | 7.44 | 7.59 | 8.12 | 9.44 | .... | 7.75 | 7.77 | 9.44 |
| Los Angeles | 8.15 | 10.00 | 11.00 | 51.50 | 8.50 | 8.15 | 8.70 | 10.90 | 14.35 | 8.30 | 8.75 | 10.55 |
| Milwaukee | 7.22 | 8.33 | 9.19 | .... | 7.30 | 7.36 | 7.89 | 7.94 | 13.14 | 7.60 | 7.54 | 8.81 |
| Moline, Ill. | 7.15 | 8.44 | 8.85 | .... | 7.41 | 7.43 | ... | 8.00 | .... | 7.63 | 7.34 | ... |
| New York | 7.78 | 8.88 | 9.63 | 53.13 | 8.23 | 8.16 | 8.71 | 9.77 | 13.47 | 8.11 | 8.21 | 9.50 |
| Norfolk, Va. | 7.35 | ... | ... | .... | 7.80 | 7.85 | ... | 9.95 | .... | 8.10 | 7.60 | 9.10 |
| Philadelphia | 7.34 | 8.44 | 9.41 | 45.98 | 7.99 | 7.73 | 8.26 | 8.52 | 13.25 | 7.75 | 7.72 | 8.83** |
| Pittsburgh | 7.13 | 8.24 | 9.40 | 49.00 | 7.21 | 7.27 | 7.80 | 8.00 | 13.05 | 7.43 | 7.45 | 8.72 |
| Portland, Oreg. | 7.80 | 8.80 | 10.65 | .... | 8.00 | 7.95 | ... | 12.20 | 15.00 | 7.85 | 7.75 | 9.60 |
| Richmond, Va. | 7.25 | ... | 9.49 | .... | 7.85 | 7.85 | ... | 9.50 | .... | 8.10 | 7.50 | 9.35 |
| St. Louis | 7.42 | 8.53 | 9.69 | 43.89 | 7.50 | 7.56 | 8.09 | 8.29 | 13.34 | 7.83 | 7.74 | 9.01 |
| St. Paul | 7.46 | 8.59 | 9.16 | .... | 7.72 | 7.74 | ... | 8.51 | 13.51 | 7.94 | 7.65 | 9.12 |
| San Francisco | 8.20 | 9.65 | 10.15 | 51.65 | 8.35 | 8.15 | 8.70 | 11.45 | 14.35[3] | 8.25 | 8.30 | 10.50 |
| Seattle | 7.85 | 10.50 | 10.90 | 54.00 | 8.90 | 8.60 | 9.15 | 12.25 | 14.65 | 8.50 | 8.50 | 10.70 |
| Spokane, Wash. | 8.90 | 11.25 | 11.05 | .... | 9.05 | 8.75 | 9.30 | 12.40 | 15.55 | 8.65 | 8.65 | 11.35 |
| Washington | 7.78 | 9.80 | 8.60 | .... | 8.49 | 8.24 | ... | 9.40 | .... | 8.51 | 8.11 | 9.56 |

*Prices do not include gage extras; †prices include gage and coating extras (based on 13.50-cent zinc), except in Birmingham (coating extra excluded); ‡includes 25-cent special bar quality extras; **½-in. and heavier; ††as annealed; ‡‡under ½-in.

Base quantities 2000 to 4999 lb except as noted; Cold-rolled strip and cold-finished bars, 2000 lb and over except in Seattle, 2000 to 9999 lb, and in Los Angeles, 6000 lb and over; stainless sheets, 5000 lb except in Chicago, New York and Boston, 10,000 lb, and in San Francisco, 2000 to 4999 lb; hot-rolled products on West Coast, 2000 to 9999 lb; [3]—500 to 9999 lb; [4]—400 to 999 lb; [5]—4000 lb and over; [6]—1000 to 1999 lb; [7]—1500 to 3999 lb; [8]—2000 to 3999 lb; [9]—f.o.b. local delivery in lots of 10,000 lb and over; [10]—2000 lb and over.

# why make your salesman an advertising medium?

Our text for today is taken from the plaint of a young industrial salesman whose company issues a catalog, exhibits in a few trade shows, but does no other advertising.

"When I make a call," he told us, "I not only have to introduce myself—I have to introduce my Company. By the time I have explained who we are and what we make, I have used up a large part of the time the prospect is willing to give me. In my field we sell by picking out from our line the type of products the prospect uses and showing him what these products will do for him. If the Company would use a well-balanced advertising program, I'd have at least 20 more minutes of *real* selling time on every call."

To our way of thinking, that salesman appreciates the value of his own time and his Company's dollars.

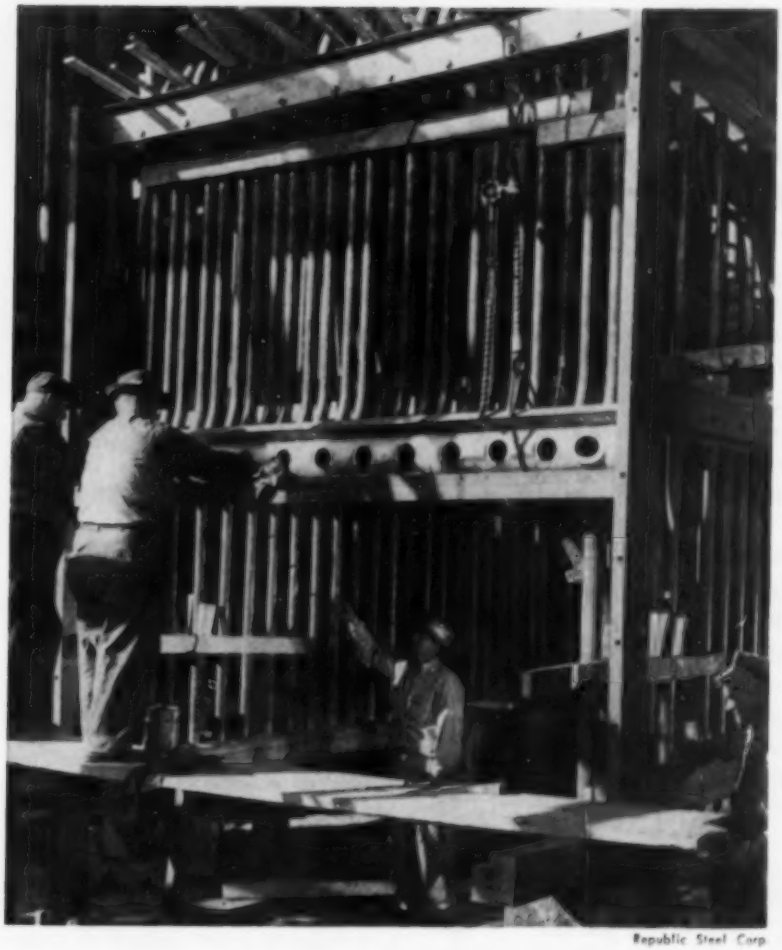
Selling any product to industry involves matching product information to the prospective buyer's problems. That's a job that can be done only by personal selling. That's why you use salesmen—at an average cost of approximately $20 per call.

When you use part of a salesman's time on a job that can be done more cheaply—and far more effectively—by some form of advertising, you are tossing away a considerable portion of your sales dollar. *Your salesman is just about the most expensive advertising medium you can use!*

## National Industrial Advertisers Association, Inc.

271 Madison Avenue, New York 16, New York

An organization of over 4000 members engaged in the advertising and marketing of industrial products, with local chapters in ALBANY, BALTIMORE, BOSTON, BUFFALO, CHICAGO, CLEVELAND, COLUMBUS, DALLAS-FORT WORTH, DENVER, DETROIT, HAMILTON, ONT., HARTFORD, HOUSTON, INDIANAPOLIS, LOS ANGELES, MILWAUKEE, MINNEAPOLIS-ST. PAUL, MONTREAL, QUE., NEWARK, NEW YORK, PHILADELPHIA, PITTSBURGH, PORTLAND, ROCHESTER, ROCKFORD, ST. LOUIS, SAN FRANCISCO, TORONTO, ONT., YOUNGSTOWN.



Republic Steel Corp.

*Growing demand for boilers later this year will put . . .*

# Pressure on Pressure Tubes

PRESSURE TUBEMAKERS are building up steam to handle heavy sales expected in last half of this year and beyond.

Philip Sporn, president, American Gas & Electric Service Corp., New York, reports one reason for the bright sales outlook: "The two largest coal-burning, steam-electric generating units ever built will be constructed for the American Gas & Electric system." Mr. Sporn adds that his firm is designing these larger, more efficient units to provide increased power requirements of the next few years.

**Tubing Prospects** — Producers of pressure tubing are equally pleased by sales prospects to boilermakers.

Pressure tubes (either welded or seamless made from carbon or alloy steel) carry fluids under pressure and at low or elevated temperatures. Leading applications include boilers, oil still tubes, heat exchangers and condensers.

**Wins Contract**—Babcock & Wilcox Co., New York, will build the boilers for American Gas & Electric. Each of the 450,000-kw units will cost $55 million. Each will require 1.3 million tons of coal annually. Both boilers will stand as high as a 23-story building and will exhaust to a poured concrete stack about 500 ft above ground level.

Growth in boiler requirements will begin to swell pressure tubing shipments in the last half of this year, in 1957 and 1958, Babcock & Wilcox officials predict. At a stockholders meeting, Alfred Iddles, president, said the current backlog of orders totals $286 million, compared with $130 million one year ago—due largely to increasing boiler orders.

**More for Utilities**—B&W sales officials add: "Utilities' demand for pressure tubing is already on the increase and will be stronger in the second half of this year. We may not see full results of rising requirements until we have statistics for 1957 shipments."

Salesmen at Pittsburgh Steel Co. say: "Need for boiler tubing should rise for ten years. The trend is toward larger stations requiring more tubing. New units need as much as 2000 tons of tubing each, and a growing part of this is the alloy type."

**Boilers Strong**—Demand is increasing for smaller boilers, too. Officials of Republic Steel Corp., Cleveland, say: "There's an upswing in pressure tubing applications in boilers for heating apartment houses and similar buildings."

The outlook beyond 1957 is equally encouraging. The electric power industry increased capacity from 50 million kw in 1945 to 120 million kw in 1955 and plans a further increase of 100 million kw by 1965.

**Many Markets** — While attention focuses on boiler requirements, other major pressure markets are expanding. Officials of National Tube Division, U. S. Steel Corp., Pittsburgh, say: "Sales are strong for uses in refineries and chemical processing plants. Tubemakers satisfactorily met strong increases in petrochemical and refinery needs since 1950, so boiler expansion shouldn't tax our capacities."

Says the sales manager for another tubemaker: "Atomic energy requirements, in areas of high pressure and temperature, are strong. Oil country users plan a strong well drilling year in 1956. They will require more tubing for areas of high pressure and temperature as they drill deeper."

**Other Extreme**—There's a growth in use of stainless steel pressure tubing for subzero service. In chemical processing, temperatures drop to 150° F below zero. In the liquefaction and separation of gases, they may go even lower.

The trend is to a larger percentage of total shipments in alloy and stainless tubing. Higher pressures and temperatures in boilers demand more alloy tubing. Use of impure river water in many power plants causes corrosion problems solved by a swing to stainless pressure tubing.

**Enough Capacity**—Sales prospects

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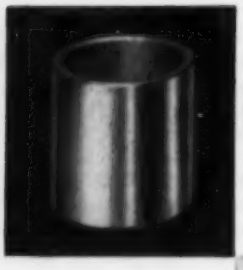

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are brightening, but no strain on capacity is in sight. "Builders of new power plants may be delayed by lack of steel plate for electrical equipment but not by a shortage of pressure tubes," one tubemaker explains.

Several markets have reduced requirements since 1953, making more capacity available to meet boiler tubing requirements. The American Iron & Steel Institute, New York, reports 1953 shipments totaled 440,675 tons, declining to 276,068 tons in 1955. Among shrinking markets: Construction, including maintenance, plumbing, locomotives and shipbuilding. While some of these consumers may return to earlier levels of demand, tubemakers will have sufficient capacity to handle the new surge in boiler requirements.

## Some Steel Extras Raised

U. S. Steel Corp. and its general operating divisions, American Steel & Wire, Columbia-Geneva Steel and Tennessee Coal & Iron, effected upward revisions in certain chemical content extras for carbon special quality bars, carbon rods, wire and semifinished products, and for alloy steels. Width and gage extras for alloy plate, and alloy sheet and strip were also raised. Also, upward changes were effected in the electric steel extra for alloy bars, rods, wire and semifinished products.

At the same time, the National Tube Division of the corporation made comparable adjustments in its prices covering alloy tubing.

Over-all effect: Increases are estimated to be approximately 1 per cent on the involved products. New extras became effective May 11.

## Tubular Goods . . .

Tubular Goods Prices, Page 172

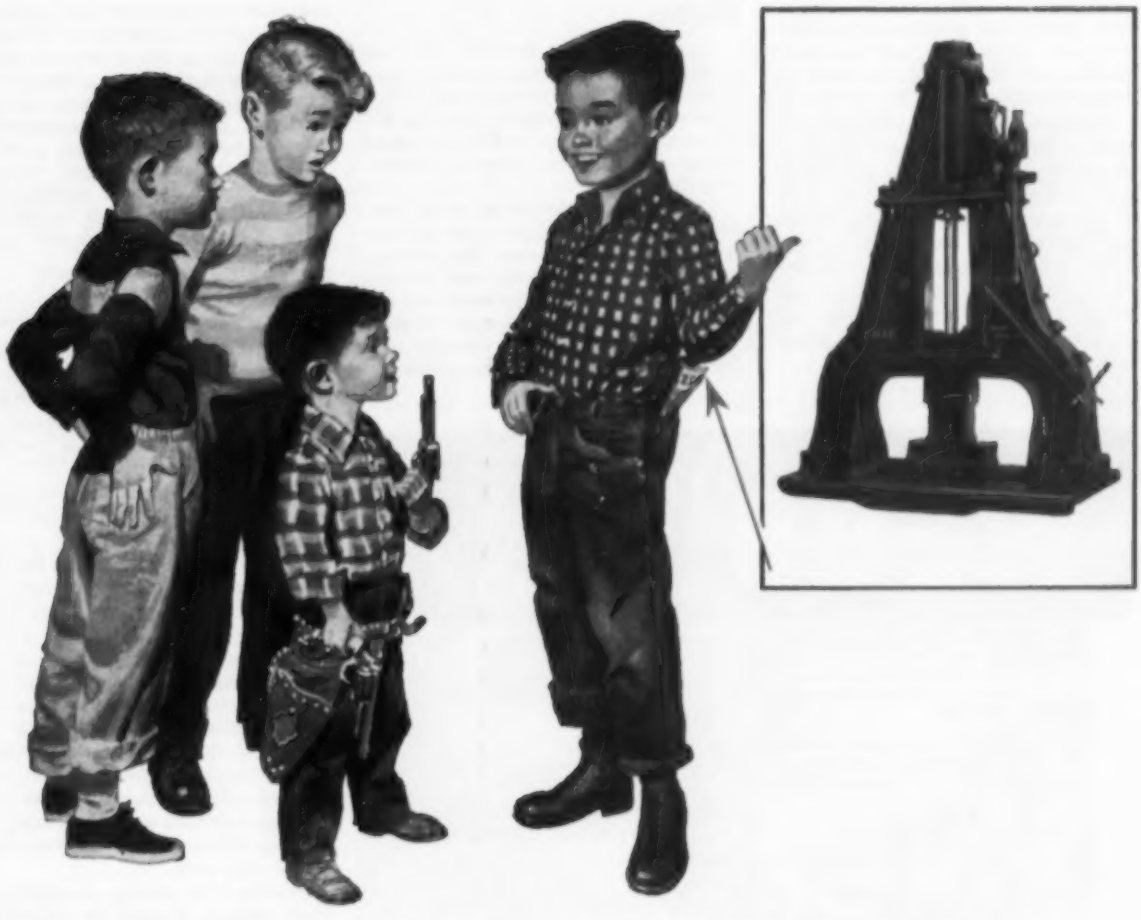
Buttweld pipe, which has been in sluggish demand for some time, is showing signs of a seasonal pickup. Producers' books are beginning to fill up, one in the East reporting it is booked solidly through July.

Lapweld pipe also is moving well. Seamless pipe demand continues to far outstrip supply.

The mills expect most consumers will take their full quotas in all tubular products this summer. This is particularly true in the case of oil country goods and line pipe. There may be some decline in automotive requirements for mechanical tubing, however, but other markets are seen holding strong over the months immediately ahead.

Price extras covering alloy tubing were increased May 11 by National Tube Division, U. S. Steel Corp.

The bar supply situation appears to



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be somewhat easier. In hot carbon bars, supply still is tight in the small flats and angles, as well as large rounds and flats, but the over-all picture is improved.

Effective May 15, Youngstown Sheet & Tube Co. increased prices of oil country C.W. carbon steel tubing and casing to the following: 2⅜-in. OD 4.60# nonupset tubing, $44.90 per 100 ft, f.o.b. mill; 2⅜-in. OD 4.70# external upset tubing, $48.29; 2⅞-in. OD 6.40# nonupset tubing, $58.99; 2⅞-in. OD 6.50# external upset tubing, $63.49; 4½-in. OD 9.50# C.W. casing, $82.56.

## Plates . . .

Plate Prices, Page 168

Platemakers are being pressed for more third quarter tonnage than they have to offer. Business is coming in from all consuming directions, with water tank specifications in a noticeable flurry.

Due to the easier situation at the sheet mills, more light gage plates are becoming available. The stringency in the medium and heavy gages, however, is as pronounced as ever. Fabricators of large oil and water tanks can't get enough, the railroads are clamoring for tonnage. The chemical industry, and makers of line pipe are pressing for volume. Steady improvement in demand from the shipyards also is in evidence.

Only in light gage and narrow widths is plate supply improved in New England, due to more production of strip-plate. Gages heavier than ½-in. are in short supply, with allotments on wider mills restricted. Plate shop inventories are low.

## Sheets, Strip . . .

Sheet & Strip Prices, Pages 169 & 170

Improvement in the general sheet and strip supply situation continues. While demand for hot-rolled sheets remains relatively strong, specifications for cold-rolled sheets are declining.

Some of the slack in cold-rolled sheet business should be counteracted by expected increases in galvanized sheet requirements for the government's grain bin program.

Electrical sheet inquiry is no more than 80 per cent of what it was a few weeks ago, says a leading seller in the Philadelphia district. This indicates that perhaps the pipelines on consumer durables are beginning to fill up. But this may be due partly to seasonal factors and may be of short duration now that housing construction is beginning to pick up sharply after a slow start earlier this year.

Despite this easing in electrical sheet demand, inquiry for enameling stock is holding up well. In nickel-bearing stainless, demand remains strong in flat-rolled products.

Helping to bolster production at hot-sheet mills are railroad equipment specifications for 3/16 and ¼-in. sheet steel. Producers of kitchen equipment and home appliances also remain active in the hot-rolled sheet market.

Mills are taking varied actions to cope with the new market situation. In Pittsburgh, where hot-rolled sheet is still in short supply, producers plan to schedule some of the excess cold-finishing capacity in July and August to the production of hot-rolled sheet. In Chicago, at least one producer has switched from rolling strip to light plate, which is in heavy demand.

Numerous sheet consumers in New England are not taking all tonnage set up by July allotments. Firmness of some orders on books is questioned should production continue high without the interruption of a strike. Demand in this district is slower by virtue of the accumulation of substantial inventories and increase in shipments from mills. Dividend tonnage is being offered on some sheet


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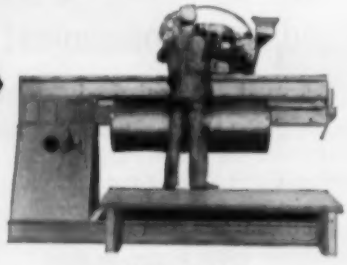
Machine is of all steel construction.



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For Illustrated Literature—Write Department D

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specialties for the first time in months.

Faced with declines in auto production and demand from appliance manufacturers, Pittsburgh sheet producers expect to maintain shipments at a high level through June. It's generally conceded in that district that there will be a decline in July and August production of cold-finished sheet, but producers remain optimistic about long-range prospects.

They point out that auto production is disappointing only when compared with last year's record total. Auto makers had been expected to trim requirements this summer, but steel has not been ordered for 1957 models. When orders are placed, it should result in sharp pickups in cold-finished sheet sales in September and the following months.

## Tool Steel . . .

Shipments of high speed and tool steel (excluding hollow drill steel) totaled 11,370 net tons in March, reports the American Iron & Steel Institute. This was an increase, compared with 10,613 tons in February, and 9869 tons in March, 1955.

Total tonnage shipped in the first three months this year is reported at 33,096. This is up sharply from the 25,593 tons moved in the first three months of 1955.

## Steel Bars . . .

Bar Prices, Page 168

Cold finishers report a definite lag in demand for sizes ½-in. and under, and add that while the order pattern in general is good, it still is not as good as it was a month ago.

Buying of cold finished for August and September is better than for July, and there is some buying for October. This forward ordering is more noticeable among manufacturers than jobbers, although the latter are pushing harder for nearby tonnage, that is shipments through July. Demand for cold-finished alloy bars continues quiet, and that for hot alloys is not much livelier.

Cold finishers are expected to revise their extras in line with changes being put into effect by the hot mills.

Pittsburgh area fabricators say hot-rolled deliveries have improved considerably since first quarter. As a result, building of inventories may be possible before the end of June. Several large consumers are already reported adding to their stocks.

Increases in extras now being put into effect are not accepted by consumers without some grumbling. U. S. Steel and subsidiaries announced upward revisions in certain chemical content extras for carbon special quality bars and alloy bars, May 11. Also, electric furnace steel extras for alloy bars were revised upward. The over-all effect is an increase of about 1 per cent in prices.

So-called dividend bar tonnage for this quarter is moving slowly in New England, except for the leaded grades, deliveries of which extend to July-August on production orders. Use of leaded stock is growing, with supply still limited to relatively few mills. Carbon bar distribution in the area has reached the point where selling is required to move tonnage. Converters are in better balance with hot-rolled supplies and consumer inventories are being built up to near normal in most cases, including alloys and stainless.

No slackening in demand for bars is noted in the St. Louis market where supply is reported as tight as ever. Deliveries there still extend 90 days. Reason for the scarcity at that point is attributed to the limiting of production by mills.

Initial production off the merchant bar mill of the Northeastern Steel Corp., Bridgeport, Conn., is scheduled in August. Hot-rolled carbon sizes, rounds, will be ⅜ to 4-in.; smaller in alloys, including stainless. Later, up to 6-in. will be available in carbon

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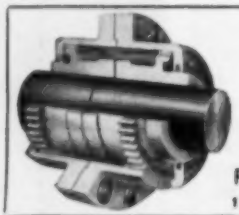

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bars. Delay in obtaining electrical equipment because of the recent Westinghouse strike has held up original rolling schedules.

## Reinforcing Bars . . .

**Reinforcing Bar Prices, Page 168**

Pressure for reinforcing tonnage is increasing as the shortage of structurals is diverting more building construction to concrete reinforcing. The bar mills hold heavy order backlogs, and they are growing steadily.

Rolling mills in the Pacific Northwest are well booked up. They report substantial volume coming to them in the way of small lots. Bethlehem Pacific Coast Steel Corp. will furnish 1800 tons of reinforcing bars for a plant addition at Metaline Falls, Wash., for the Lehigh Portland Cement Co.

## Wire . . .

**Wire Prices, Pages 170 & 171**

Seasonal improvement in demand for merchant wire products is reported generally. The pickup in nail buying is particularly noticeable. Manufacturers wire in all grades and ranges continues in strong demand. Many consumers are reportedly building inventories in anticipation of higher prices at midyear.

Demand for wire strand for prestressed concrete structures is growing, notably for bridges, it is reported in the New England area. This is adding to heavy backlogs for all types of reinforcing, highway fabric, strand and concrete pipe. This is expected to be a peak year for highway guard rail strand.

Automotive demand is slower. But textile equipment builders are heavier wire consumers. Most users of heading and other industrial wire are covered through the second quarter with inventories about normal. Incoming third quarter volume is limited.

## Structural Shapes . . .

**Structural Shape Prices, Page 168**

Extended structural steel deliveries are retarding the placing of new construction contracts. An increasing amount of relatively light work, including bridges, schools and commercial structures, are being designed for reinforced concrete because of the scarcity of structurals. In some instances, projects are being deferred temporarily.

In New England, structural fabricators are operating to the extent steel is available, but most of them are losing ground on delivery schedules. Critical third quarter shortages are seen because of May production

## Ores

**Lake Superior Iron Ore**

(Prices effective for the 1956 shipping season, gross ton, 51.50% iron natural, rail of vessel, lower lake ports)

| | |
|---|---|
| Old range bessemer | $11.25 |
| Old range nonbessemer | 11.10 |
| Mesabi bessemer | 11.00 |
| Mesabi nonbessemer | 10.85 |
| Open-hearth lump | 12.10 |
| High phos. | 10.85 |

The foregoing prices are based on upper lake rail freight rates, lake vessel freight rates, handling and unloading charges, and taxes thereon, which were in effect Dec. 1, 1955, and increases or decreases after such date are for seller's account.

**Eastern Local Iron Ore**

Cents per unit, deld. E. Pa.

| | |
|---|---|
| Foundry and basic 52-62% concentrates contract | 17.00-18.00 |

**Foreign Iron Ore**

Cents per unit, c.i.f. Atlantic ports

| | |
|---|---|
| Swedish basic, 60-68% | 26.00 |
| N. African hematite (spot) | nom. 18.00-20.00 |
| Brazilian iron ore, 68-69% | 13.00c, f.o.b. Victoria. |

**Tungsten Ore**

Net ton unit, before duty

| | |
|---|---|
| Foreign, wolframite, good commercial quality | $33.00-$35.50 |
| Domestic, scheelite, mine | 43.00 |

**Manganese Ore**

Mn 48%, delivery within six months, $1.15 nom. per long ton unit, c.i.f. U. S. ports, duty for buyer's account; 46-47%, $1.05 nom.

**Chrome Ore**

Gross ton, f.o.b. cars New York, Philadelphia, Baltimore, Charleston, S. C., plus ocean freight differential for delivery to Portland, Oreg., Tacoma, Wash.

*Indian and African*

| | |
|---|---|
| 48% 2.8:1 | nom. $45.00-$50.00 |
| 48% 3:1 | 42.00-44.00 |
| 48% no ratio | 34.00 |

*South African Transvaal*

| | |
|---|---|
| 44% no ratio | $19.00-$20.00 |
| 48% no ratio | 33.00-35.00 |

*Domestic*

Rail nearest seller

| | |
|---|---|
| 18% 3:1 | $39.00 |

**Molybdenum**

| | |
|---|---|
| Sulphide concentrate, per lb of Mo content, mines, unpacked | $1.10 |

**Antimony Ore**

Per unit of Sb content, c.i.f. seaboard

| | |
|---|---|
| 55-60% | $3.60-$3.85 |
| 60-65% | 3.85-4.00 |

**Vanadium Ore**

Cents per lb $V_2O_5$ content, deld. mills

| | |
|---|---|
| Domestic | 31.00 |

## Refractories

**Fire Clay Brick (per 1000)**

*High-Heat Duty:* Ashland, Grahn, Hayward, Hitchins, Haldeman, Olive Hill, Ky., Athens, Troup, Tex., Beech Creek, Clearfield, Curwensville, Lock Haven, Lumber, Orviston, West Decatur, Pa., Bessemer, Ala., Parber, Mexico, St. Louis, Vandalia, Mo., Ironton, Oak Hill, Parral, Portsmouth, O., Ottawa, Ill., Stevens Pottery, Ga., $122; Salina, Pa., $127; Niles, O., $133.

*Super-Duty:* Ironton, O., Vandalia, Mo., Olive Hill, Ky., Clearfield, Pa., New Savage, Md., St. Louis, $150.

**Silica Brick (per 1000)**

*Standard:* Alexandria, Claysburg, Mt. Union, Sproul, Pa., Ensley, Ala., Windham, Portsmouth, O., Hawstone, Pa., $128; Warren, Niles, O., Hays, Pa., $133; Morrisville, Pa., $131.50; E. Chicago, Ind., Joliet, Rockdale, Ill., $138; Lehigh, Utah, $144; Los Angeles, $151.

*Super Duty:* Hays, Sproul, Hawstone, Pa., Niles, Warren, Windham, O., Leslie, Md., Athens, Tex., $145; Morrisville, Pa., $148; Joliet, Ill., $151; Curtner, Calif., $163.

**Semisilica Brick (per 1000)**

Clearfield, Pa., $139; Philadelphia, $124; Woodbridge, N. J., $122.

**Ladle Brick (per 1000)**

*Dry Pressed:* Alsey, Ill., Chester, New Cumberland, W. Va., Freeport, Johnstown, Merrill Station, Pa., Mexico, Vandalia, Mo., $88.50; Wellsville, O., $92.50; Clearfield, Pa., Portsmouth, O., $98.

**High-Alumina Brick (per 1000)**

*50 Per Cent:* St. Louis, Mexico, Vandalia, Mo., $194; Danville, Ill., $197; Philadelphia, Clearfield, Pa., $201.

*60 Per Cent:* St. Louis, Mexico, Vandalia, Mo., $241; Danville, Ill., $244; Philadelphia, Clearfield, Pa., $248.

*70 Per Cent:* St. Louis, Mexico, Vandalia, Mo., $279; Danville, Ill., $281; Philadelphia, Clearfield, Pa., $286.

**Sleeves (per 1000)**

Reesdale, Johnstown, Bridgeburg, Pa., $157; Clearfield, Pa., $158.50; St. Louis, $169.30.

**Nozzles (per 1000)**

Reesdale, Pa., $253.70; Johnstown, Pa., $259.20; Clearfield, Pa., $259.40; St. Louis, $259.45; Bridgeburg, Pa., $258.

**Runners (per 1000)**

Reesdale, Johnstown, Bridgeburg, Pa., $196; Clearfield, Pa., $196; St. Louis, $195.80.

**Dolomite (per net ton)**

Domestic, dead-burned, bulk, Billmeyer, Blue Bell, Williams, Plymouth Meeting, York, Pa., Millville, W. Va., Bettsville, Millersville, Martin, Woodville, O., Gibsonburg, Narlo, O., $15; Thornton, McCook, Ill., $15.00; Dolly Sding, Bonne Terre, Mo., $14.

**Magnesite (per net ton)**

Domestic, dead-burned, bulk, ¼-in. grains with fines: Chewelah, Wash., $40; Luning, Nev., $40. ⅝-in. grains with fines: Baltimore, $66.40.

## Metallurgical Coke

Price per net ton

**Beehive Ovens**

| | |
|---|---|
| Connellsville, furnace | $13.75-14.50 |
| Connellsville, foundry | 16.00-17.00 |

**Oven Foundry Coke**

| | |
|---|---|
| Birmingham, ovens | $25.65 |
| Cincinnati, deld. | 30.58 |
| Buffalo, ovens | 27.50 |
| Buffalo, deld. | 28.75 |
| Camden, N. J., ovens | 26.50 |
| Chicago, ovens | 27.00 |
| Chicago, deld. | 28.50 |
| Detroit, ovens | 27.50 |
| Detroit, deld. | 28.50 |
| Pontiac, deld. | 29.06 |
| Saginaw, deld. | 30.58 |
| Erie, Pa., ovens | 27.50 |
| Everett, Mass., ovens | |
| New England, deld. | *28.55 |
| Indianapolis, ovens | 26.75 |
| Ironton, O., ovens | 26.00 |
| Cincinnati, deld. | 28.59 |
| Kearny, N. J., ovens | 26.75 |
| Lone Star, Tex., ovens | 19.50 |
| Milwaukee, ovens | 27.50 |
| Neville Island, (Pittsburgh) Pa., ovens | 26.25 |
| Painesville, O. ovens | 27.50 |
| Cleveland, deld. | 29.43 |
| Philadelphia, ovens | 26.50 |
| St. Louis, ovens | 28.50 |
| St. Paul, ovens | 26.50 |
| Swedeland, Pa., ovens | 26.50 |
| Terre Haute, Ind., ovens | 26.75 |

*Or within $4.85 freight zone from works.

## Coal Chemicals

**Spot, cents per gallon, ovens**

| | |
|---|---|
| Pure benzene | 36.00 |
| Toluene, one deg. | 32.00-34.00 |
| Industrial xylene | 32.00-35.00 |

Per ton, bulk, ovens

| | |
|---|---|
| Ammonium sulphate | $42-$45 |
| Birmingham area | 42.00† |

†With port equalization against imports.

Cents per pound, producing point

Phenol: Grade 1, 15.00; Grade 2-3, 14.50; Grade 4, 16.50; Grade 5, 15.25.

## Fluorspar

Metallurgical grades, f.o.b. shipping point, in Ill., Ky., net tons, carloads, effective $CaF_2$ content 72.5%, $38-$39; 70%, $35-$36; 60%, $31-$32. Imported, net tons, f.o.b. cars point of entry, duty paid, metallurgical grade: European, $34; Mexican, $26.50.

## Electrodes

Threaded with nipple, unboxed, f.o.b. plant

**GRAPHITE**

| Inches | | Per |
|---|---|---|
| Diam | Length | 100 lb |
| 2 | 24 | $52.50 |
| 2½ | 30 | 33.75 |
| 3 | 40 | 32.00 |
| 4 | 40 | 30.25 |
| 5½ | 40 | 30.00 |
| 6 | 60 | 27.25 |
| 7 | 60 | 26.75 |
| 8, 9, 10 | 60 | 24.25 |
| 12 | 72 | 27.25 |
| 14 | 60 | 23.50 |
| 16 | 72 | 22.50 |
| 17 | 60 | 23.00 |
| 18 | 72 | 22.50 |
| 20 | 72 | 22.25 |

**CARBON**

| | | |
|---|---|---|
| 8 | 60 | 12.10 |
| 10 | 60 | 11.80 |
| 12 | 60 | 11.75 |
| 14 | 60 | 11.70 |
| 14 | 72 | 10.85 |
| 17 | 60 | 10.75 |
| 17 | 72 | 10.35 |
| 20 | 84 | 10.30 |
| 20 | 90 | 10.10 |
| 24 | 72, 84 | 10.30 |
| 24 | 90 | 10.05 |
| 30 | 84 | 10.20 |
| 40, 35 | 110 | 9.90 |
| 40 | 100 | 9.90 |

blankouts and reduced June allotments.

While some shapemakers have opened books for third quarter, the tonnage available for the period is far less than buyers are seeking. The stringency in supply, especially in wide flange sections, is seen continuing into fourth quarter.

Continued excess of demand over supply is leading some producers to urge users to adopt better organized year-around programs for buying structurals. They think supply conditions would be much better if demand were spread out through the year.

## Warehouse . . .

Warehouse Prices, Page 173

Warehouse steel business is off a little from its April level. A gradual lag is developing in distributors' sales of sheet, wire and fasteners for applications in household appliances, farm equipment and farm maintenance.

There is still far more demand for plates and shapes than distributors can handle because of limited stocks.

While hot-rolled carbon bars are moving well, there is not quite the rapid turnover of a few weeks ago. One sales manager for a Chicago warehouse says he expects to get additional bar supplies from the mills in the third quarter.

The outlook for the third quarter is taking shape. Distributors are not pessimistic concerning prospects, but they point out that vacations at many metalworking plants will center on the first week in July and will affect sales in late June and July. At the same time, there will be much unfilled demand for plate and structurals spilling over into the third quarter.

## Pig Iron . . .

Pig Iron Prices, Page 173

Merchant pig iron business is being maintained at a fairly high level as consumers continue to accumulate inventories and melt substantial tonnages. Stock accumulation is to cushion the effects of higher prices (which are likely after steel labor contract adjustments have been made) and also those of a steel strike should peaceful efforts to make adjustments fail. Stock building may continue well into June, although undoubtedly at the expense of business later in the summer.

In the New England district, machine tool and textile mill equipment industries are operating at a high level, thus requiring large tonnages of iron castings. The first castings are being poured at the new $6-million foundry of Bullard Machine Co., Bridgeport, Conn.

Demand for merchant iron in the Buffalo district is holding at high levels.

## Iron Ore . . .

Iron Ore Prices, Page 181

Lake shipments of iron ore in the week ended May 14 totaled 2,839,723 gross tons, reports the Lake Superior Iron Ore Association. This brought the movement to date to 10,973,201 tons. This tops shipments in the like period of 1955 by 2,500,000 tons.

Woodward Iron Co., Birmingham, purchased two of the Muscoda iron mines, the No. 5 limestone mine, and certain trackage rights from Tennessee Coal & Iron Division, U. S. Steel Corp. The purchased mines, Nos. 4 and 5, adjoin the Woodward company's Pyne mine, being separated by a barrier pillar. This will be removed so that both mines can be operated jointly. It is said this acquisition will prolong the life of the Pyne mine and postpone opening up the company's Wildwood reserves for 15 years.

Blocked Iron Corp. of America will


Because it identifies *Hoeganaes Ancor-Flame*—sponge iron powder—which when fed into an oxyacetylene flame oxidizes rapidly and greatly increases flame temperature; allowing a flame-cut or scarfing of stainless steels and oxidation-resistant metals. There's an interesting story behind the product, behind this label. Ask for more details, you'll be interested in the result.

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build a $1-million ore processing plant at Philadelphia adjacent to the Pennsylvania Railroad's new $12-million ore unloading pier. The plant will process raw iron ore into blocks for charging into steelmaking furnaces. Completion of the first unit is scheduled for August, says Louis G. Imperato, president of the company.

## Steel Shipments Set Record

Larger finished steel tonnage was shipped during March than in any previous month in history, according to the American Iron & Steel Institute. The month's movement totaled a record 8,255,824 net tons, which was more than 485,000 tons greater than shipments of 7,770,213 tons in the prior record month of June, 1955.

Record monthly tonnages during March included: Structural shapes (485,393 tons); reinforcing bars (217,321); oil country goods (255,639); electrolytic tin plate (598,129); galvanized sheets (291,193); electrical sheets and strip (81,948).

Market classifications receiving record tonnages in the month included: Warehouses and distributors (1,562,726 net tons); construction, including maintenance (947,576); contractors' products (401,383); machinery, industrial equipment and tools (485,497); electrical machinery and equipment (231,817); appliances, utensils and cutlery (240,717); other domestic and commercial equipment (221,894); containers (859,112).

The automotive industry's take in the month amounted to 1,404,000 net tons, 17.7 per cent of total shipments. In February this industry took 1,490,000 tons, 20.8 per cent of the total, and in March, 1955, its receipts were 1,679,000 tons, 24.1 per cent of the over-all steel movement in the period.

## Shipments of Finished Steel—March, 1956

(All Grades; Net Tons)

| Product | Carbon | Alloy | Stainless | Total Year To Date 1956 | 1955 |
|---|---|---|---|---|---|
| Ingots | 73,673 | 15,504 | 2,885 | 240,805 | 111,397 |
| Blooms, slabs, etc. | 166,714 | 58,284 | 2,507 | 650,348 | 656,439 |
| Tube rounds | 324 | 51 | 25 | 1,242 | NA |
| Skelp | 17,514 | ..... | ..... | 43,721 | 31,434 |
| Wire rods | 106,389 | 2,638 | 541 | 309,657 | 276,643 |
| Structurals | 481,449 | 3,928 | 16 | 1,369,154 | 1,060,983 |
| Steel piling | 39,165 | 4 | ..... | 101,247 | 77,027 |
| Plates | 657,705 | 46,553 | 2,999 | 1,908,377 | 1,439,111 |
| Rails (standard) | 120,675 | ..... | ..... | 344,424 | 306,106 |
| Rails (other) | 10,717 | ..... | ..... | 32,215 | 16,464 |
| Joint bars | 8,206 | ..... | ..... | 29,753 | 12,566 |
| Tie plates | 36,505 | ..... | ..... | 99,553 | 68,260 |
| Track spikes | 11,565 | ..... | ..... | 29,321 | 20,151 |
| Wheels | 33,370 | 42 | ..... | 91,716 | 69,137 |
| Axles | 16,650 | 50 | ..... | 44,713 | 28,179 |
| Bars (hot rolled) | 674,126 | 197,356 | 5,723 | 2,303,671 | 2,108,006 |
| Bars (reinforcing) | 217,321 | ..... | ..... | 573,369 | 495,377 |
| Bars (cold finished) | 143,276 | 29,219 | 5,481 | 527,126 | 433,762 |
| Tool steel | 1,560 | 9,810 | ..... | 33,096 | 25,593 |
| Standard pipe | 271,605 | 17 | 1 | 745,817 | 635,290 |
| Oil country goods | 207,647 | 47,992 | ..... | 732,559 | 566,428 |
| Line pipe | 299,194 | ..... | ..... | 860,529 | 509,004 |
| Mechanical tubing | 63,057 | 27,738 | 387 | 273,154 | 213,723 |
| Pressure tubing | 27,569 | 4,721 | 2,014 | 91,285 | 58,098 |
| Wire—drawn | 281,913 | 5,194 | 3,231 | 831,090 | 709,061 |
| Nails & staples | 55,786 | ..... | ..... | 154,474 | 161,851 |
| Wire—barbed | 11,029 | ..... | ..... | 28,101 | 43,937 |
| Woven wire fence | 32,591 | ..... | ..... | 87,015 | 109,227 |
| Hale ties | 5,459 | ..... | ..... | 11,812 | 9,985 |
| Black plate | 86,909 | ..... | ..... | 228,965 | 185,181 |
| Tin Plate—HD | 113,257 | ..... | ..... | 272,168 | 295,497 |
| Tin Plate—Electro | 598,129 | ..... | ..... | 1,404,984 | 1,099,723 |
| Sheets (hot rolled) | 803,741 | 47,653 | 1,340 | 2,496,660 | 2,296,402 |
| Sheets (cold rolled) | 1,307,297 | 6,907 | 13,270 | 3,908,300 | 3,581,950 |
| Sheets (galvanized) | 291,193 | ..... | ..... | 833,654 | 649,156 |
| Sheets (other coated) | 23,132 | ..... | ..... | 70,589 | 63,500 |
| Sheets (Enameling) | Not available. | Included in | cold-rolled | sheets. | 71,770 |
| Electrical sheets | 13,833 | 68,115 | ..... | 223,882 | 153,348 |
| Strip—hot rolled | 173,872 | 3,398 | 185 | 527,965 | 495,097 |
| Strip—cold rolled | 136,488 | 1,650 | 17,702 | 479,673 | 415,451 |
| Total shipments | 7,620,710 | 576,826 | 58,288 | 23,307,273 | 19,398,315 |

## Steel Sets April Record

Production of steel ingots in April set a record for that month at 10,547,000 net tons, reports the American Iron & Steel Institute. This compares with 10,924,788 tons in March and 9,815,095 tons in April, 1955.

April was the seventh month in succession in which steel production exceeded 10 million tons.

The April total brought output for the first four months of the year to a record 42,419,014 net tons. In the first four months of 1955 production was only 37.1 million tons.

The Institute's preliminary report shows that steelmaking furnaces in April operated at an average of 100 per cent of the Jan. 1, 1956 capacity, rated at 128,363,090 net tons per year. The rate for March was 100.2 per cent.

The index of steel production (1947-49 equals 100) was 153.2 in April, compared with 153.6 in March and 142.6 in April last year.

| Period | OPEN HEARTH Net tons | Per cent of capacity | ‡Index | BESSEMER Net tons | Per cent of capacity | ‡Index | ELECTRIC Net tons | Per cent of capacity | ‡Index | TOTAL Net tons | Per cent of capacity | ‡Index | Calculated weekly production (Net tons) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1956 | | | | | | | | | | | | | |
| January | 9,676,151 | 101.4 | 151.1 | 823,235 | 79.5 | 92.0 | 828,845 | 86.6 | 232.1 | 10,828,231 | 99.3 | 152.2 | 2,444,296 |
| February | 9,045,064 | 101.3 | 150.9 | 296,543 | 78.0 | 90.2 | 779,388 | 87.1 | 233.3 | 10,118,995 | 99.2 | 152.1 | 2,444,202 |
| *March | 9,795,263 | 102.7 | 152.9 | 316,060 | 76.3 | 88.2 | 819,465 | 85.7 | 229.4 | 10,924,788 | 100.2 | 153.6 | 2,466,092 |
| *1st Quarter | 28,514,478 | 101.8 | 151.6 | 928,838 | 77.9 | 90.2 | 2,427,698 | 86.5 | 231.5 | 31,872,014 | 99.6 | 152.6 | 2,451,693 |
| †April | 9,443,000 | 102.3 | 152.3 | 306,000 | 77.8 | 90.0 | 798,000 | 86.2 | 230.9 | 10,547,000 | 100.0 | 153.2 | 2,459,000 |
| 1955 | | | | | | | | | | | | | |
| January | 8,554,345 | 86.0 | 125.7 | 199,229 | 49.0 | 56.7 | 584,162 | 63.6 | 163.6 | 8,837,736 | 82.7 | 124.2 | 1,994,974 |
| February | 7,734,884 | 91.5 | 133.7 | 197,091 | 53.7 | 62.1 | 564,959 | 68.1 | 175.1 | 8,496,934 | 88.0 | 132.2 | 2,124,233 |
| March | 9,060,026 | 96.7 | 141.4 | 255,493 | 62.8 | 72.7 | 666,235 | 72.6 | 186.5 | 9,981,754 | 93.4 | 140.3 | 2,253,281 |
| 1st Quarter | 24,849,255 | 91.4 | 133.8 | 651,813 | 55.2 | 63.9 | 1,815,356 | 68.1 | 175.1 | 27,316,424 | 88.0 | 132.3 | 2,124,139 |
| April | 8,558,549 | 97.7 | 142.9 | 275,080 | 69.8 | 80.9 | 681,477 | 76.6 | 197.2 | 9,515,095 | 94.8 | 142.6 | 2,287,991 |
| May | 9,307,291 | 99.4 | 145.3 | 305,347 | 75.1 | 86.9 | 715,678 | 77.9 | 200.4 | 10,328,316 | 96.6 | 145.2 | 2,331,448 |
| June | 8,764,430 | 96.6 | 141.4 | 282,544 | 72.0 | 83.4 | 698,493 | 78.6 | 202.1 | 9,746,467 | 94.1 | 141.6 | 2,271,994 |
| 2nd Quarter | 26,950,270 | 97.9 | 143.2 | 863,960 | 72.3 | 83.8 | 2,095,648 | 77.7 | 199.9 | 29,589,878 | 95.2 | 143.1 | 2,297,454 |
| 1st 6 Months | 51,779,525 | 94.7 | 138.5 | 1,515,773 | 63.8 | 73.9 | 3,911,004 | 72.9 | 187.5 | 57,206,302 | 91.6 | 137.7 | 2,211,299 |
| July | 8,232,535 | 88.1 | 128.5 | 288,348 | 66.1 | 76.4 | 500,063 | 65.5 | 168.0 | 9,100,946 | 85.3 | 127.9 | 2,059,035 |
| August | 8,660,812 | 91.8 | 134.3 | 298,972 | 73.5 | 85.1 | 745,888 | 84.1 | 215.8 | 9,882,325 | 92.7 | 143.5 | 2,308,954 |
| September | 8,829,264 | 97.6 | 142.4 | 307,171 | 78.2 | 90.3 | 694,000 | 75.7 | 194.6 | 9,884,645 | 89.7 | 134.9 | 2,195,812 |
| 3rd Quarter | 25,662,413 | 92.4 | 135.0 | 874,491 | 72.6 | 83.9 | 2,040,912 | 75.0 | 192.5 | 28,577,816 | 90.2 | 135.4 | 2,176,528 |
| 9 Months | 77,441,938 | 93.9 | 137.3 | 2,390,264 | 66.8 | 77.2 | 5,951,916 | 73.6 | 189.2 | 85,784,118 | 91.1 | 136.9 | 2,199,593 |
| October | 9,589,704 | 100.0 | 146.2 | 330,150 | 81.2 | 94.0 | 801,196 | 87.3 | 224.3 | 10,501,050 | 98.2 | 147.6 | 2,370,440 |
| November | 9,141,244 | 100.5 | 147.5 | 306,674 | 77.9 | 90.2 | 799,480 | 89.9 | 231.3 | 10,247,398 | 99.0 | 148.8 | 2,388,671 |
| December | 9,496,531 | 100.7 | 146.9 | 292,429 | 72.1 | 83.2 | 804,559 | 87.8 | 225.3 | 10,593,519 | 98.5 | 147.6 | 2,376,362 |
| 4th Quarter | 27,817,479 | 100.5 | 146.9 | 929,253 | 77.0 | 89.1 | 2,405,235 | 88.3 | 226.9 | 31,251,967 | 98.6 | 148.0 | 2,378,384 |
| Last Half | 53,579,892 | 96.5 | 140.9 | 1,803,744 | 74.8 | 86.5 | 4,446,147 | 81.7 | 209.7 | 59,829,783 | 94.4 | 141.7 | 2,277,495 |
| Total 1955 | 105,359,417 | 95.6 | 139.7 | 3,319,517 | 69.3 | 80.2 | 8,357,151 | 77.3 | 198.7 | 117,036,085 | 93.0 | 139.7 | 2,244,651 |

Note—The percentages of capacity operated are calculated on weekly capacities in 1956 of 2,154,144 net tons open hearth, 91,810 net tons bessemer and 215,939 net tons electric ingots and steel for castings, total 2,461,893 net tons; based on annual capacities as of Jan. 1, 1956, as follows: Open hearth 112,317,040 net tons, bessemer 4,787,060 net tons, electric 11,259,355 net tons, total 128,363,090 net tons.

Note—The percentages of capacity operated are calculated on weekly capacities in 1955 of 2,114,196 net tons open hearth, 91,810 net tons bessemer and 207,272 net tons electric ingots and steel for castings, total 2,413,278 net tons; based on annual capacities as of Jan. 1, 1955, as follows: Open hearth 110,234,160 net tons, bessemer 4,787,060 net tons, electric 10,807,150 net tons, total 125,828,210 net tons.

*Revised. †Preliminary figures, subject to revision. ‡Index of production based on average weekly production of the three years 1947-1948-1949.

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## Scrap . . .

Scrap Prices, Page 186

**Chicago** — "Just call it a sloppy market," is the way one dealer here comments on the scrap situation. Prices dropped again last week, $1 or more on most classifications. Further weakening is expected. Noticeable last week were rising inventories in some of the dealers' yards. When the prices were rising, the mills were not inclined to place too many orders, and now that a steel strike is threatened, they aren't too keen about increasing supplies at the lower prices.

**Philadelphia** — Steel scrap prices are off $2 and $3 a ton in most cases, and are on a generally nominal basis. For the last three weeks or so, trading has been light, and recently it has been at a virtual standstill. Most mills have fair inventories and have been withholding from the market as much as possible on the chance of obtaining lower prices.

**New York**—With business quiet, district brokers have reduced their prices $1 a ton on No. 1 heavy melting and No. 1 bundles to $48-$49. They have marked down No. 2 heavy melting to $37-$38 and No. 2 bundles to $34-$35. Machine shop turnings are lower at $27-$28 and low phos structural and plate at $49-$50. Cast iron grades are unchanged.

**Pittsburgh**—No. 1 heavy melting scrap is moving to mills at $50 a ton, marking a decline of $2 in one week and $6 in one month from the high of April. Steelmakers' requirements are expected to drop in the third quarter. Larger amounts of scrap also are available.

The price decline is general, except for cast iron grades and stainless scrap. Turnings, borings and cut structurals are quoted $2 a ton below week-ago prices. In stainless scrap, 18-8 bundles and solids continue to fluctuate widely, and prices are largely nominal. Demand remains strong.

**Cleveland**—Scrap prices continue to decline. Over the last week No. 1 grades dropped about $5 per ton in this market. This brings the decline on the No. 1 steelmaking grades in the last four weeks to over $8 a ton. The reduction has been even sharper in the Valley where some material a month ago sold at $66 and $67 per ton. The same material is available at $53-$54, a sale being made last week at $54.

The secondary grades of scrap have been hit even harder than the No. 1 grades. No. 2 heavy melting, for example, has been selling well above $50. Today, it is quoted $37-$38. One exception to the severe weakness is to be found in the blast furnace grades. Here, prices are off only slightly. The cast grades are down $3 to $4 per ton.

Cause for the weakness in the market is easily explained. The sharp runup in prices in April was bound to be followed by a severe decline, according to brokers and dealers. Two other factors intensify the downward pressure: 1. Mills are reluctant buyers in the face of a threatened strike at the end of June. 2. A heavy influx of scrap to dealers yards, which was attracted out by the high prices.

### Ferroalloy Prices

FERROALLOY quotations remain unchanged. The current price schedule was published in full on page 212 of the May 14 issue of STEEL.

**Buffalo**—Scrap is steady despite weakness at other consuming centers. One Buffalo mill placed a limited tonnage for secondary mill grades at $1 above the prevailing market, but the order was not considered representative. Secondary grades are still being quoted at prices paid by a larger mill earlier this month for substantial tonnage, namely $42 for No. 2 heavy melting and $39 for No. 2 bundles.

The price on No. 1 heavy melting is uncertain. One user paid $55 for a limited tonnage, while another is paying $54. Some dealers believe No. 1 would bring no more than $52 on volume sales. Cast iron scrap is unchanged at $51 for No. 1 cupola.

**Cincinnati**—Scrap prices continue soft here, with dips of from $1 to $2 a ton reported on most grades. The declines are based on limited quantity sales. Prices are expected to hold for a while.

**Boston**—Except for a slight decline in No. 2 heavy melting steel, scrap prices are steadier after the recent sharp break. Brokers are paying $44, shipping point, for the bulk of No. 1 heavy melting moved, although for district mills the price is $1 higher. Yards are paying $32-$33 for unprepared No. 1 steel.

**Detroit** — The scrap market here continues weak, with little buying by local consumers in evidence. The feeling is that prices will continue soft throughout most of this month; that something of a rally will develop toward the end of the period. No. 2 grades of scrap are particularly sluggish. More wildcat strikes are anticipated as contract negotiations near in the steel industry. Currently, the district ingot rate is estimated at 97.8 per cent of capacity, against 97.2 a week ago, and 88.5 a year ago.

**St. Louis**—Scrap prices took another beating last week, particularly the cast iron grades, which were off from $1 to $6 a ton. Charging box cast was hardest hit, dropping from $41 to $35. Rail scrap was least affected, although all rails were down from 50 cents to $3 a ton. Heavy melting scrap, bundles Nos. 1 and 2, and No. 1 busheling were down $3 a ton each.

The trouble is simple: Too much scrap moving to mills and foundries. Mills are cautious about overloading because of the strike threat and an expected cut in operations during the third quarter.

**Birmingham**—The cast iron market moved ahead last week. No. 1 cupola cast and stove plate advanced $1 on fair-sized tonnage sales, but other items held. The market is steady at prices established the first of the month on open-hearth grades.

**Los Angeles** — Scrap prices here have advanced an average of $4 a ton. No. 1 heavy melting is quoted $41 and No. 2 heavy melting $37. No. 1 bundles are up $3 to $40 and No. 2

(*Please turn to page* 188)

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# Iron and Steel Scrap

Consumer prices, per gross ton, except as otherwise noted, including broker's commission, as reported to STEEL. *Changes shown in italics.*

## STEELMAKING SCRAP COMPOSITE

| | |
|---|---|
| May 16 | $51.00 |
| May 9 | 53.00 |
| Apr. Avg. | 54.87 |
| May 1955 | 34.87 |
| May 1951 | 44.00 |

Based on No. 1 heavy melting grade at Pittsburgh, Chicago and eastern Pennsylvania

### PITTSBURGH

| | |
|---|---|
| *No. 1 heavy melting* | *49.00-50.00* |
| *No. 2 heavy melting* | *41.00-44.00* |
| *No. 1 bundles* | *49.00-50.00* |
| *No. 2 bundles* | *41.00-42.00* |
| *No. 1 busheling* | *49.00-50.00* |
| *Machine shop turnings* | *36.00-37.00* |
| *Mixed borings, turnings* | *36.00-37.00* |
| *Short shovel turnings* | *40.00-41.00* |
| *Cast iron borings* | *40.00-41.00* |
| *Cut structurals, 3 ft lengths* | *59.00-60.00* |
| *Heavy turnings* | *48.00-49.00* |
| *Punchings & plate scrap* | *59.00-60.00* |
| *Electric furnace bundles* | *58.00-59.00* |

Cast Iron Grades

| | |
|---|---|
| No. 1 cupola | 51.00-52.00 |
| Charging box cast | 47.00-48.00 |
| Heavy breakable cast | 47.00-48.00 |
| Unstripped motor blocks | 35.00-36.00 |
| No. 1 machinery cast | 57.00-58.00 |

Railroad Scrap

| | |
|---|---|
| *No. 1 R.R. heavy melt.* | *60.00-61.00* |
| Rails, 2 ft and under | 70.00-71.00 |
| Rails, 18 in. and under | 71.00-72.00 |
| Rails, random lengths | 65.00-66.00 |
| *Railroad specialties* | *64.00-65.00* |

Stainless Steel Scrap

| | |
|---|---|
| *18-8 bundles & solids* | *360.00-375.00* |
| *18-8 turnings* | *255.00-270.00* |
| 430 bundles & solids | 110.00-120.00 |
| 430 turnings | 60.00-65.00 |

### CLEVELAND

| | |
|---|---|
| *No. 1 heavy melting* | *49.00-50.00* |
| *No. 2 heavy melting* | *37.00-38.00* |
| *No. 1 bundles* | *49.00-50.00* |
| *No. 2 bundles* | *35.00-36.00* |
| *No. 1 busheling* | *49.00-50.00* |
| *Machine shop turnings* | *30.00-31.00* |
| *Mixed borings, turnings* | *34.00-35.00* |
| *Short shovel turnings* | *34.00-35.00* |
| *Cast iron borings* | *34.00-35.00* |
| *Low phos.* | *52.00-55.00* |
| *Cut structural plates 2 ft and under* | *55.00-56.00* |
| Alloy free, short shovel turnings | 37.00-38.00 |
| *Electric furnace bundles* | *51.00-52.00* |

Cast Iron Grades

| | |
|---|---|
| *No. 1 cupola* | *54.00-55.00* |
| *Charging box cast* | *43.00-44.00* |
| *Stove plate* | *51.00-52.00* |
| *Heavy breakable cast* | *44.00-45.00* |
| *Unstripped motor blocks* | *30.00-31.00* |
| *Brake shoes* | *40.00-41.00* |
| *Clean auto cast* | *54.00-55.00* |
| *Burnt Cast* | *40.00-41.00* |
| *Drop broken machinery* | *55.00-56.00* |

Railroad Scrap

| | |
|---|---|
| *No. 1 R.R. heavy melt.* | *57.00-58.00* |
| *R.R. malleable* | *62.00-63.00* |
| *Rails, 2 ft and under* | *70.50-71.50* |
| *Rails, 18 in. and under* | *69.00-70.00* |
| *Rails, random lengths* | *65.00-66.00* |
| *Cast steel* | *58.00-59.00* |
| *Railroad specialties* | *59.00-60.00* |
| *Uncut tires* | *60.00-61.00* |
| *Angles, splice bars* | *65.00-66.00* |
| *Rails, rerolling* | *68.00-69.00* |

Stainless Steel

(Brokers' buying prices; f.o.b. shipping point)

| | |
|---|---|
| 18-8 bundles, solids | 345.00-355.00 |
| 18-8 turnings | 205.00-215.00 |
| 430 clips, bundles, solids | 100.00-110.00 |
| 430 turnings | 50.00-60.00 |

### YOUNGSTOWN

| | |
|---|---|
| *No. 1 heavy melting* | *53.00-54.00* |
| *No. 2 heavy melting* | *41.00-42.00* |
| *No. 1 bundles* | *53.00-54.00* |
| *No. 2 bundles* | *38.00-39.00* |
| *No. 1 busheling* | *53.00-54.00* |
| *Machine shop turnings* | *32.00-33.00* |
| *Short shovel turnings* | *36.00-37.00* |
| *Cast iron borings* | *36.00-37.00* |
| *Low phos.* | *54.00-55.00* |
| *Electric furnace bundles* | *54.00-55.00* |

Railroad Scrap

| | |
|---|---|
| *No. 1 R.R. heavy melt.* | *59.00-60.00* |

### CHICAGO

| | |
|---|---|
| *No. 1 heavy melting* | *49.00-50.00* |
| *No. 2 heavy melting* | *39.00-40.00* |
| *No. 1 factory bundles* | *54.00-55.00* |
| *No. 1 dealer bundles* | *49.00-50.00* |
| No. 2 bundles | 28.00-29.00 |
| *No. 1 busheling* | *51.00-52.00* |
| *Machine shop turnings* | *29.00-30.00* |
| *Mixed borings, turnings* | *30.00-31.00* |
| *Short shovel turnings* | *30.00-31.00* |
| *Cast iron borings* | *30.00-31.00* |
| Cut structurals, 3 ft | 56.00-57.00 |
| Punchings & plate scrap | 57.00-58.00 |

Cast Iron Grades

| | |
|---|---|
| No. 1 cupola | 52.00-53.00 |
| Stove plate | 46.00-47.00 |
| Unstripped motor blocks | 40.00-41.00 |
| Clean auto cast | 55.00-56.00 |
| Drop broken machinery | 55.00-56.00 |

Railroad Scrap

| | |
|---|---|
| *No. 1 R.R. heavy melt.* | *54.00-55.00* |
| R.R. malleable | 63.00-64.00 |
| Rails, 2 ft and under | 71.00-72.00 |
| Rails, 18 in. and under | 74.00-75.00 |
| Angles, splice bars | 66.00-67.00 |
| Rails, rerolling | 72.00-73.00 |

Stainless Steel Scrap

| | |
|---|---|
| 18-8 bundles & solids | 380.00-395.00 |
| 18-8 turnings | 270.00-280.00 |
| 430 bundles & solids | 105.00-110.00 |
| 430 turnings | 55.00-60.00 |

### DETROIT

(Brokers' buying prices; f.o.b. shipping point)

| | |
|---|---|
| *No. 1 heavy melting* | *48.00* |
| *No. 2 heavy melting* | *38.00* |
| *No. 1 bundles* | *48.00* |
| *No. 2 bundles* | *29.00* |
| *No. 1 busheling* | *47.00* |
| Machine shop turnings | 24.00 |
| Mixed borings, turnings | 24.00 |
| Short shovel turnings | 28.00 |
| Punchings & plate scrap | 63.00 |

Cast Iron Grades

| | |
|---|---|
| No. 1 cupola | 46.00 |
| Charging box cast | 39.00 |
| Stove plate | 38.00 |
| Heavy breakable | 38.00 |
| Unstripped motor blocks | 26.00 |
| Clean auto cast | 52.00 |
| Malleable | 52.00 |

### BIRMINGHAM

| | |
|---|---|
| No. 1 heavy melting | 39.00-40.00 |
| No. 2 heavy melting | 37.00-38.00 |
| No. 1 bundles | 39.00-40.00 |
| No. 2 bundles | 31.00-32.00 |
| No. 1 busheling | 39.00-40.00 |
| Cast iron borings | 21.50-22.50 |
| Short shovel turnings | 32.00-33.00 |
| Machine shop turnings | 31.00-32.00 |
| Electric furnace bundles | 44.00-45.00 |

Cast Iron Grades (F.o.b. shipping point)

| | |
|---|---|
| *No. 1 cupola* | *48.50-49.50* |
| *Stove plate* | *47.00-48.00* |
| Bar crops and plate | 52.00-53.00 |
| Structural & plate, 2 ft | 51.00-52.00 |
| Unstripped motor blocks | 37.00-38.00 |
| Charging box cast | 32.00-33.00 |
| No. 1 wheels | 39.00-40.00 |

Railroad Scrap

| | |
|---|---|
| No. 1 R.R. heavy melt. | 50.00-51.00 |
| Rails, 18-in. and under | 63.00-64.00 |
| Rails, rerolling | 65.00-66.00 |
| Rails, random lengths | 60.00-61.00 |
| Angles, splice bars | 59.00-60.00 |

### PHILADELPHIA

| | |
|---|---|
| *No. 1 heavy melting* | *54.00†* |
| *No. 2 heavy melting* | *45.00†* |
| *No. 1 bundles* | *54.00†* |
| *No. 2 bundles* | *43.00†* |
| *No. 1 busheling* | *54.00†* |
| *Electric furnace bundles* | *55.00†* |
| *Mixed borings, turnings* | *37.00†* |
| *Machine shop turnings* | *25.00†* |
| *Short shovel turnings* | *40.00†* |
| *Heavy turnings* | *49.00†* |
| *Structurals & plates* | *57.00-58.00†* |
| *Couplers, springs, wheels* | *62.50†* |
| *Rail crops, 2 ft & under* | *66.00†* |

Cast Iron Grades

| | |
|---|---|
| No. 1 cupola | 51.00-52.00 |
| *Malleable* | *68.00* |
| Heavy breakable cast | 54.00 |
| Drop broken machinery | 54.00 |

†Nominal

### NEW YORK

(Brokers' buying prices)

| | |
|---|---|
| *No. 1 heavy melting* | *48.00-49.00* |
| *No. 2 heavy melting* | *37.00-38.00* |
| *No. 1 bundles* | *48.00-49.00* |
| *No. 2 bundles* | *34.00-35.00* |
| *Machine shop turnings* | *27.00-28.00* |
| Mixed borings, turnings | 31.00-32.00 |
| Short shovel turnings | 33.00-34.00 |
| *Low phos. (structural & plate)* | *49.00-50.00* |

Cast Iron Grades

| | |
|---|---|
| No. 1 cupola | 44.00-45.00 |
| Unstripped motor blocks | 33.00-35.00 |
| Heavy breakable | 46.00-47.00 |

Stainless Steel

| | |
|---|---|
| 18-8 sheets, clips solids | 320.00-325.00 |
| 18-8 borings, turnings | 165.00-175.00 |
| 430 sheets, clips, solids | 120.00-125.00 |
| 410 sheets, clips, solids | 100.00-105.00 |

### BOSTON

(Brokers' buying prices; f.o.b. shipping point)

| | |
|---|---|
| No. 1 heavy melting | 44.00-45.00 |
| *No. 2 heavy melting* | *33.50-34.00* |
| No. 1 bundles | 44.00-45.00 |
| *No. 2 bundles* | *31.00-32.00* |
| No. 1 busheling | 44.00-45.00 |
| Machine shop turnings | 26.00-26.50 |
| Mixed borings, turnings | 27.00-27.50 |
| Short shovel turnings | 29.00-29.50 |
| No. 1 cast | 43.00-43.50 |
| Mixed cupola cast | 41.50-42.00 |
| No. 1 machinery cast | 44.50-45.00 |

### BUFFALO

| | |
|---|---|
| No. 1 heavy melting | 53.00-54.00 |
| No. 2 heavy melting | 41.00-42.00 |
| No. 1 bundles | 53.00-54.00 |
| No. 2 bundles | 38.00-39.00 |
| No. 1 busheling | 53.00-54.00 |
| Mixed borings, turnings | 31.00-32.00 |
| Machine shop turnings | 31.00-32.00 |
| Short shovel turnings | 34.00-35.00 |
| Cast iron borings | 31.00-32.00 |
| Low phos. | 56.00-57.00 |

Cast Iron Grades (F.o.b. shipping point)

| | |
|---|---|
| No. 1 cupola | 50.00-51.00 |
| No. 1 machinery | 54.00-55.00 |

Railroad Scrap

| | |
|---|---|
| Rails, random lengths | 58.00-59.00 |
| Rails, 3 ft and under | 64.00-65.00 |
| Railroad specialties | 60.00-60.00 |

### CINCINNATI

(Broker's buying prices; f.o.b. shipping point)

| | |
|---|---|
| *No. 1 heavy melting* | *49.00-50.00* |
| *No. 2 heavy melting* | *38.00-39.00* |
| *No. 1 bundles* | *49.00-50.00* |
| *No. 2 bundles* | *36.00-37.00* |
| *No. 1 busheling* | *49.00-50.00* |
| *Machine shop turnings* | *29.00-30.00* |
| *Mixed borings, turnings* | *31.00-32.00* |
| *Short shovel turnings* | *32.50-33.50* |
| *Cast iron borings* | *29.00-30.00* |
| *Low phos., 18 in.* | *54.00-55.00* |

Cast Iron Grades

| | |
|---|---|
| *No. 1 cupola* | *45.00-46.00* |
| Heavy breakable cast | 46.00-47.00 |
| Charging box cast | 46.00-47.00 |
| Drop broken machinery | 55.00-56.00 |

Railroad Scrap

| | |
|---|---|
| *No. 1 R.R. heavy melt.* | *58.00-59.00* |
| *Rails, 18 in. and under* | *66.00-67.00* |
| *Rails, random lengths* | *60.00-61.00* |

### ST. LOUIS

(Brokers' buying prices)

| | |
|---|---|
| *No. 1 heavy melting* | *40.00* |
| *No. 2 heavy melting* | *37.00* |
| *No. 1 bundles* | *40.00* |
| *No. 2 bundles* | *33.00* |
| *No. 1 busheling* | *40.00* |
| *Machine shop turnings* | *26.00†* |
| *Short shovel turnings* | *27.00†* |

Cast Iron Grades

| | |
|---|---|
| *No. 1 cupola* | *45.00* |
| *Charging box cast* | *35.00* |
| *Heavy breakable cast* | *35.00* |
| *Unstripped motor blocks* | *35.00* |
| *Brake shoes* | *42.00* |
| *Clean auto cast* | *46.00* |
| Stove plate | 42.00 |

Railroad Scrap

| | |
|---|---|
| *No. 1 R.R. heavy melt.* | *55.50* |
| *Rails, 18 in. and under* | *66.00* |
| *Rails, random lengths* | *61.50* |
| *Rails, rerolling* | *70.00* |
| *Angles, splice bars* | *55.00* |

†Nominal

### SEATTLE

| | |
|---|---|
| No. 1 heavy melting | 40.00 |
| No. 2 heavy melting | 36.00-38.00 |
| No. 1 bundles | 36.00-38.00 |
| No. 2 bundles | 28.00-30.00 |
| No. 3 bundles | 20.00 |
| Machine shop turnings | 23.00-25.00 |
| *Mixed borings, turnings* | *23.00-25.00* |
| Electric furnace No. 1 | 52.00-55.00 |

Cast Iron Grades (F.o.b. shipping point)

| | |
|---|---|
| No. 1 cupola | 40.00-43.00 |
| Heavy breakable cast | 37.00 |
| No. 1 wheels | 37.00 |
| Unstripped motor blocks | 38.00-41.00 |
| Stove plate (f.o.b. plant) | 38.00-41.00 |
| Brake shoes | 38.00 |

Railroad Scrap

| | |
|---|---|
| Rails, random lengths | 40.00 |

### LOS ANGELES

| | |
|---|---|
| No. 1 heavy melting | 35.00 |
| No. 2 heavy melting | 32.00 |
| No. 1 bundles | 37.00 |
| No. 2 bundles | 28.00 |
| Machine shop turnings | 17.00 |

Cast Iron Grades (F.o.b. shipping point)

| | |
|---|---|
| No. 1 cupola | 42.00 |

### SAN FRANCISCO

| | |
|---|---|
| No. 1 heavy melting | 40.00 |
| No. 2 heavy melting | 37.00 |
| No. 1 bundles | 39.00 |
| No. 2 bundles | 32.00 |
| No. 1 busheling | 40.00 |
| Machine shop turnings | 20.00-23.00 |
| Mixed borings, turnings | 20.00-23.00 |
| Cast iron borings | 20.00-23.00 |
| Short shovel turnings | 25.00 |
| Cut structurals | 45.00 |
| Heavy turnings | 20.00-23.00 |
| Punchings & plate scrap | 44.00 |

Cast Iron Grades

| | |
|---|---|
| No. 1 cupola | 45.00 |
| Charging box cast | 35.00 |
| Stove plate | 39.00 |
| Heavy breakable cast | 36.00 |
| Unstripped motor blocks | 32.00 |
| Brake shoes | 35.00 |
| Clean auto cast | 45.00 |
| No. 1 wheels | 39.00 |
| Burnt cast | 23.00 |
| Drop broken machinery | 50.00 |

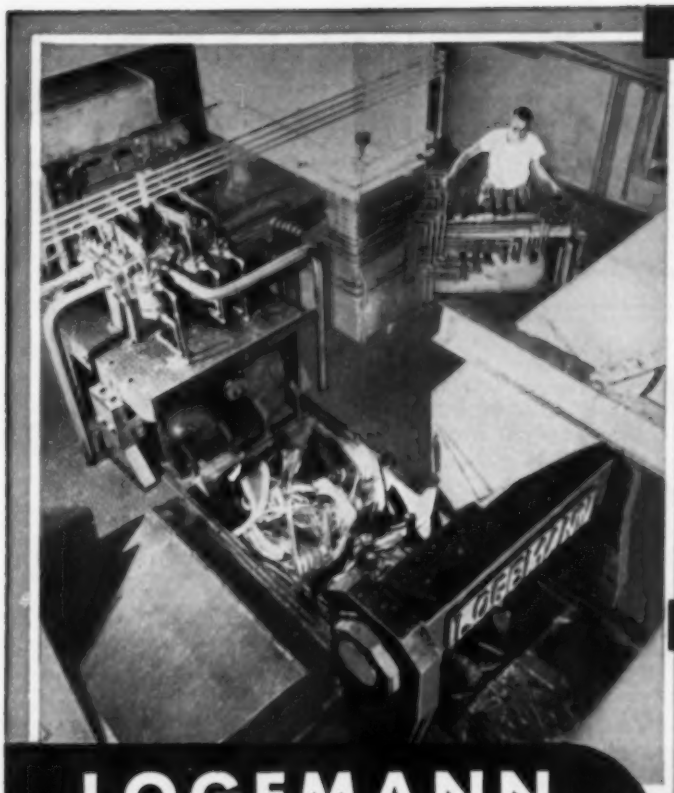
### HAMILTON, ONT.

| | |
|---|---|
| No. 1 heavy melting | 50.50 |
| No. 2 heavy melting | 46.50 |
| No. 1 bundles | 50.50 |
| No. 2 bundles | 43.00 |
| Mixed steel scrap | 44.50 |
| Mixed borings, turnings | 24.00 |
| Rails, remelting | 58.50 |
| Busheling, new factory: Prepared | 48.50 |
| Unprepared | 44.50 |
| Short steel turnings | 27.50 |

Cast Iron Grades†

| | |
|---|---|
| No. 1 machinery cast | 50.00 |

†F.o.b., shipping point.



# LOGEMANN Metal Balers

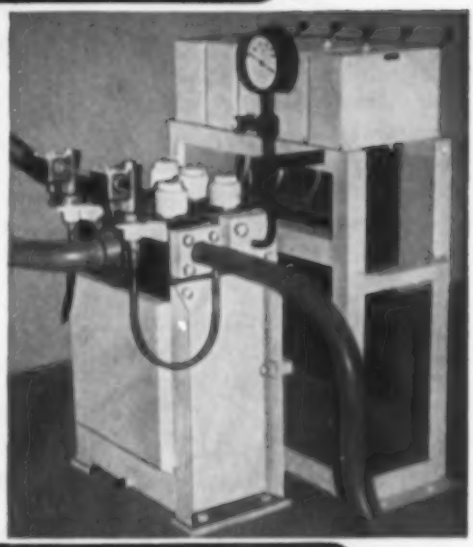
## . . . powerful . . . compact . . . capable of high tonnage output!

In the large stamping plants and rolling mills where it is critically important that trim and stamping skeletons are quickly disposed of to avoid interference with production, LOGEMANN metal balers are relied on to keep ahead of production and pack such scrap into high density, self-cohering bricks for re-melting.

Hundreds of installations have established new records for tonnage, minimum maintenance, reliability, over extended periods of uninterrupted operation at high-speed.

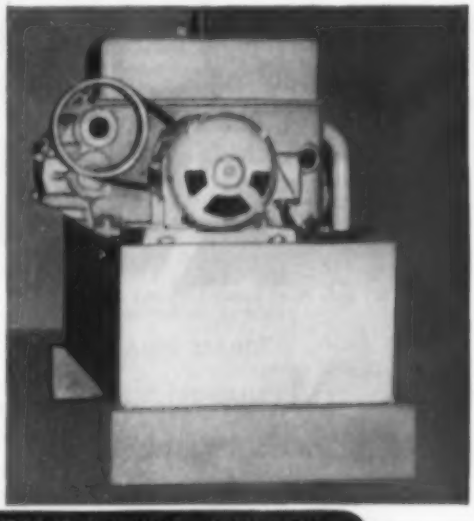
LOGEMANN models are not confined to the large sizes. Many small plants have found it profitable to use smaller sizes embodying the same features of reliability, at minimum operating cost. Interested parties are invited to write for details. Information as to the character of the scrap, tonnage to be handled in a given period of hours, and range of gauges is helpful in determining the proper model.

## LOGEMANN



## HYDRAULIC VALVES

The illustration shows a close-coupled hydraulic valve, operated by compressed-air cylinders for high-speed distribution of large gallonage of fluid at high pressure. LOGEMANN engineers have designed and built valves for many unusual as well as standard applications, and will welcome inquiries, with an outline of the conditions and requirements.



## HYDRAULIC PUMPS

The opposed-cylinder close-coupled double pressure pump shown in the illustration is mounted on an individual tank to conserve floor space under present crowded plant and operating conditions. When requesting details, please indicate the nature of the service, pressure and gallonage requirements, and the fluid to be handled.

## LOGEMANN BROTHERS CO.

3126 W. BURLEIGH STREET • MILWAUKEE 10, WISCONSIN

Metal problems that seem mountainous can be reduced to molehill size by the skill of metal specialists. Riverside metallurgists are experienced in dealing successfully with problems of friction, corrosion, temper, fatigue in non-ferrous metals. Their skill is at your service . . . and as close as your telephone.

**THE RIVERSIDE METAL COMPANY DIVISION**
**H. K. PORTER COMPANY, INC.**
Riverside, New Jersey

RIVERSIDE HKP

Philadelphia • East Orange, N. J. • Rochester, N. Y.
Hartford • Cleveland • Chicago • Detroit

**PHOSPHOR BRONZE AND NICKEL SILVER SHEET, STRIP, WIRE AND ROD**


(*Concluded from page* 185)

bundles $2 to $30. Machine shop turnings are $3 higher at $20, but not many turnings are being sold at that price. No. 1 cupola cast advanced from $42 to $46.

**San Francisco** — Recently posted higher prices for steel scrap have encouraged a moderate increase in shipments to this market. There is no noticable pile up of material, however.

**Seattle**—The scrap market is highly sensitive and subject to daily price changes. Buyers are reluctant to commit themselves openly. Receipts at tidewater are ample for heavy domestic consumption and active exports. Japan is buying in volume.

## STRUCTURAL SHAPES . . .

### STRUCTURAL STEEL PLACED

9000 tons, superstructure, high level cantilever bridge, Calumet river, Chicago Calumet Skyway project, to American Bridge Division, U. S. Steel Corp., Pittsburgh.

2685 tons, 15 grade separations and three stream crossing bridges, Connecticut turnpike project 321-01, Guilford-Clinton, Madison and Westbrook, to Harris Structural Steel Co., New York; Lane Construction Co., Meriden, Conn., general contractor; contract also takes 1715 tons, concrete reinforcing bars and 1250 tons, steel piles.

1800 tons, power plant, Hartford Electric Light Co., Hartford, Conn., to American Bridge Division, U. S. Steel Corp., Pittsburgh; Stone & Webster Engineering Corp., Boston, engineer-contractor.

1450 tons, reconstruction, Squire's bridge and approaches, Massachusetts District Commission, Somerville, Mass., to American Bridge Division, U. S. Steel Corp., Pittsburgh; Coleman Bros. Corp., Boston, general contractor; also 650 tons, reinforcing bars, and 43,000 sq ft of steel grid deck.

900 tons, boiler supports, Carolina Power & Light Co., Moncure, N. C.; Combustion Engineering Inc. to Flint Steel Co., Tulsa, Okla.

840 tons, hangar, Newark, N. J., airport, Port of New York Authority, to Elizabeth Iron Works, Elizabeth, N. J.

700 tons, boiler supports, Combustion Engineering Inc., Ladue, Mo., to Flint Steel Co., Tulsa, Okla.

570 tons, beam bridge and two overpasses, Bow-Concord, N. H., to Phoenix Bridge Co., Phoenixville, Pa.; Peter Salvucci & Sons, Waltham, Mass., general contractor; Munroe & Langstroth, Boston, bridge subcontractor.

470 tons, outdoor substation, Erie Mining Co., Aurora, Minn., to Bethlehem Steel Co., Bethlehem, Pa.

450 tons, boiler supports, Combustion Engineering Inc., Hastings, Nebr., to Flint Steel Co., Tulsa, Okla.

400 tons, addition to main building and warehouse, Phelps Dodge Copper Corp., Ft. Wayne, Ind., through Wigton-Abbott, New York, to Allied Structural Steel Companies, Chicago.

290 tons, additional facilities, Plattsburg (N. Y.) Air Force Base, to Vermont Structural Steel Co., Burlington, Vt.; Arthur Vennier Co., general contractor.

285 tons, state bridge, route 17, section 9-E, Bergen county, N. J., through Peter W. Kero, general contractor, to Todd Shipyards, Brooklyn.

285 tons, ramp to municipal bridge over the Harlem river, New York, through Woodcrest Construction Co., general contractor, to Schacht Steel Construction Inc., that city.

220 tons, state highway bridge, Pembroke, N. H., to American Bridge Division, U. S. Steel Corp., Pittsburgh; Manchester Sand & Gravel Co., Manchester, N. H., is general contractor.

200 tons, state bridge, Delaware county, New York, through Jess F. Howes, general contractor, to Bethlehem Steel Co., Bethlehem, Pa.

**ROLLING MILL WANTED**

We want to buy a hand mill capable of producing steel reinforcing bars from billets of up to 4" x 4". Write, giving details, to

**Box 423, STEEL**

**Penton Bldg. Cleveland 13, Ohio**

**STRUCTURAL DETAILERS**

Permanent positions for structural draftsmen having at least three years experience, with structural steel fabricators, on bridge and building work. Modern air-conditioned office with all employe benefits.

**St. Joseph Structural Steel Co.,**

**Box 66, Station A, St. Joseph, Mo.**

**STEEL SALESMAN**

Representative of Cold Drawn Bar Mill and other well established steel specialty firms wants salesman to cover an area within 150 mile radius New York City. Write advising experience, age and salary. Our personnel advised of this advertisement. Box No. 426, STEEL, Penton Bldg., Cleveland 13, Ohio.

**FOR SALE**

**LEWIS 22" x 12" x 40" 3 HIGH SHEET MILL**

Mill in good condition complete with 300 HP, 2300 Volt, 3 phase 60 cycle AC Westinghouse motor, motor controls, Fawcus 300 HP Herringbone reducing drive, modernized roller chain pinion stand, automatic roller and catcher tables, roll changing jig, spare rolls and spare mill screws. This Mill was purchased in 1939 and was last used on production in 1954. It can be bought at a very attractive price and terms can be arranged if necessary. For further information write to or phone T. O. Holland, Manager of Purchases, O. Ames Company, Parkersburg, W. Va.

**ENGINEERING EXECUTIVE**

Rapidly expanding steel company has opening for engineer whose administrative qualifications include the supervision of design, construction and layout of rolling mills—blast furnaces and steel making facilities.

Here is an outstanding opportunity if your abilities and experience meet the needs of this position.

Send complete resume, including salary requirements, to:

**Box 415, STEEL**

**Penton Bldg. Cleveland 13, Ohio**

**CLASSIFIED**

FOR SALE—HIGH VOLTAGE X-RAY UNIT Kelly-Koett 400 kv constant potential x-ray generator having full wave rectification and output of 20 roentgens per minute, using 7 mm of copper filtration. Adaptable for industrial radiography. Write Box 422, STEEL, Penton Bldg., Cleveland 13, Ohio.

**Help Wanted**

WANTED: FORGING CHIEF ENGINEER Opening at once in mid-west forging company for this man: Age 45-55. Must know die sinking and die design and come from independent rather than captive shop. Will have supervision of die room foreman and engineering staff. Will report direct to president. Company employing 110 men. Equipment Chambersburg board hammers up through 3000 lbs. Please state experience and present compensation. Your letter will be treated with absolute confidence. Write Box 424, STEEL, Penton Bldg., Cleveland 13, Ohio.

STEEL AND STAINLESS TUBING salesman required by nationally known manufacturer for Detroit Area. State experience, full particulars. Replies will be held confidential. Box No. 419, STEEL, Penton Bldg., Cleveland 13, Ohio.

**CLASSIFIED RATES**

All classifications other than "Positions Wanted," set solid, 50 words or less $15.00, each additional word .30, all capitals, 50 words or less $19.20, each additional word .38; all capitals leaded, 50 words or less $23.40, each additional word .47. "Positions Wanted" set solid, 25 words or less $3.60, each additional word .14; all capitals, 25 words or less $4.50, each additional word .18; all capitals leaded, 25 words or less $5.40, each additional word .22. Keyed address takes seven words. Cash with order necessary on "Positions Wanted" advertisements. Replies forwarded without charge. Displayed classified rates on request. Address your copy and instructions to STEEL, Penton Building, Cleveland 13, Ohio.

**FOR SALE**

**IMMEDIATE DELIVERY**

1—Olsen, 100,000 lb., tensile and compression testing machine M.D.
1—Olsen Impact Tester 264 ft. lbs. Charpy, 120 ft. lbs. Izod.
2—Leeds & Northrup Optical Pyrometers
1—Bausch & Lomb 5000 Mag'm. Metallographic Microscope
1—Sperry Reflectoscope, capacity 1, 2¼, & MC. Size UR
1—Magnaflux Crack Detection Tester, Size KQ3S, 3000 Amps.
Adolph Buehler 10,000 lb. Hydraulic Press, 8½" Grinder, 4½" Surfacer and size BCS Cutter.

**G. Kahn, Camden Forge Co., Mt. Ephraim Avenue, Camden, N. J. Telephone WHedlawn 3-2800.**

**HELP WANTED**

**Metallurgists:** Company engaged in basic process and pyrometallurgy requires several men for Production, Development and Quality Control who have some experience in one or more of the following: Smelting and Refining, Steelmaking or Electric Furnace Operation. Excellent opportunities for qualified men. Hospitalization, insurance and pension plan provided by Company. Plants located midwest, north and south. All replies held strictly confidential. Submit details resume to Box 413, STEEL, Penton Bldg., Cleveland 13, Ohio.


130 tons, boiler supports, Combustion Engineering Inc., Savannah, Ga., to Cantley & Co., Philadelphia.

110 tons, boiler supports, Combustion Engineering Inc., Long View, Wash., to Isaacson Iron Works, Seattle.

110 tons, addition, paper machinery plant, Rice Barton Corp., Worcester, Mass., to Stafford Iron Works, Worcester; E. J. Cross Co., Worcester, general contractor; reinforcing, Joseph T. Ryerson & Son Inc., Boston.

100 tons, trashracks, etc., The Dalles dam, Oregon, to Weldcraft Steel & Marine Co., Bellingham, Wash., low at $23,059 to U. S. Engineer, Portland, Oreg.

**STRUCTURAL STEEL PENDING**

3000 tons, addition to nursing hospital, Seattle; bids in to board of regents, University of Washington, May 15.

345 tons, state highway bridge, Brooklyn-Killingly, Conn.; Enfield Road Construction Co., Thompsonville, Conn., low on general contract; also 115 tons, reinforcing bars.

100 tons, underpass, Brunswick, Me.; bids May 23 to Augusta.

100 tons, Edmonds, Wash., high school; bids May 21.

## REINFORCING BARS . . .

**REINFORCING BARS PLACED**

1800 tons, plant addition, Lehigh Portland Cement Co., Metaline Falls, Wash., to Bethlehem Pacific Coast Steel Corp., Seattle.

1300 tons, girls' senior high school, Philadelphia, through McCloskey & Co., general contractor to American Steel Engineering Co., that city.

500 tons, warehouse, Campbell Soup Co., Camden, N. J., to Bethlehem Steel Co., Bethlehem, Pa.

250 tons, hospital, Phillipsburg, N. J., through Gottlieb Schnider, Bethlehem, Pa., general contractor, to American Steel Engineering Co., Philadelphia.

**REINFORCING BARS PENDING**

1340 tons, bridge deck, Mackinac Straits bridge, Michigan; bids to Mackinac Bridge Authority, Lansing, Mich.

650 tons, municipal sewage project, Patterson avenue, Philadelphia, CB Construction Co., that city, awarded general contract.

100 tons, completion of McMillan Reservoir No. 2, Tacoma, Wash.; Cherf Bros. & Sandkay, Ephrata, Wash., low at $829,576.

100 tons, Oregon state highway and undercrossing, Multnomah county; bids to Portland, Oreg., June 4.

100 tons, Washington state T-beam bridge, Klickitat county; general contract to Goodfellow Bros., Wenatchee, Wash., low at $704,099.

## PLATES . . .

**PLATES PLACED**

150 tons, 300,000-gal elevated water tank, Holloman Air Force Base, Alamogordo, N. Mex., to Hammond Iron Works, Provo, Utah.

100 tons, 12 deck cargo tanks for Seattle Army terminals, to Commercial Ship Co., division of Pacific Car & Foundry Co., Seattle, low at $84,327.

100 tons, water tank, Whitworth District, Spokane, Wash., to Chicago Bridge & Iron Co., Seattle.

100 tons, water tank, Madras, Oreg., to Gunderson Bros. Engineering Co., Portland, Oreg., low at $40,200.

**PLATES PENDING**

300 tons, 1000-gal tanks (610); 3/16-in. plates; bids to U. S. Engineers, Chicago.

80 tons, 500,000-gal tank, Water District No. 64, Seattle; bids May 18.

## RAILS, CARS . . .

**LOCOMOTIVES PLACED**

Canadian National, 240 diesel-electric units, awarded as follows: 80 switchers and road switchers to the Montreal Locomotive Works, Montreal; 67 switchers and road switchers, and 16 passenger units to General Motors Diesel Ltd., London, Ont.; 52 switchers and road switchers to Electro-Motive Division, General Motors Corp., La Grange, Ill., and 25 switchers and road switchers to Alco Products Inc., New York.

**RAILROAD CARS PLACED**

Kansas City Southern, 50 seventy-ton hopper cars, to Pullman-Standard Car Mfg. Co., Chicago.

Canadian National, 1880 freight cars, placed as follows: 450 seventy-ton hopper cars and 130 fifty-ton air dump cars to Eastern Car Co., Ltd., Sydney, Nova Scotia; 200 fifty-ton refrigerator cars, 200 seventy-ton drop-end highside gondola cars and 150 seventy-ton triple hopper cars to the National Steel Car Corp., Hamilton, Ont.; 200 seventy-ton covered hopper cars and 150 thirty-ton flatcars to Marine Industries Ltd., Forreil, Que., and 400 fifty-ton automobile boxcars to ACF Industries Inc., New York

Minneapolis & St. Louis, two rail diesel cars to the Budd Co., Philadelphia.

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**The Value of RELIABLE DELIVERIES**

PRODUCTION MGR., THE CINCINNATI GEAR CO.

Any job involving a large amount of responsibility is exacting. While I do not claim that mine is the toughest, I can say that the rigid policy set down by our management requires constant diligence and effort.

It is the policy of The Cincinnati Gear Company to make a delivery promise to the customer that there is every reason to expect will be fulfilled. The customer has a right to receive accurate information concerning the anticipated shipment of his order, and he also has a right to expect that promise to be fulfilled. It is the job of my department to operate our *new production scheduling system* in such a manner that accurate delivery promises can be given, and at the same time prevent the lead time from being ridiculously long. It is gratifying to state that we have failed to meet schedules only in a very limited number of instances, and many times have been successful in helping customers who, for some reason or another, found themselves in a real jam.

The management of The Cincinnati Gear Company has charged me with the responsibility for deliveries. I know there will be no compromise short of the best possible job, and I can assure you that the most meticulous plannning is done to be certain that delivery promises will be met.

**THE CINCINNATI GEAR CO.**

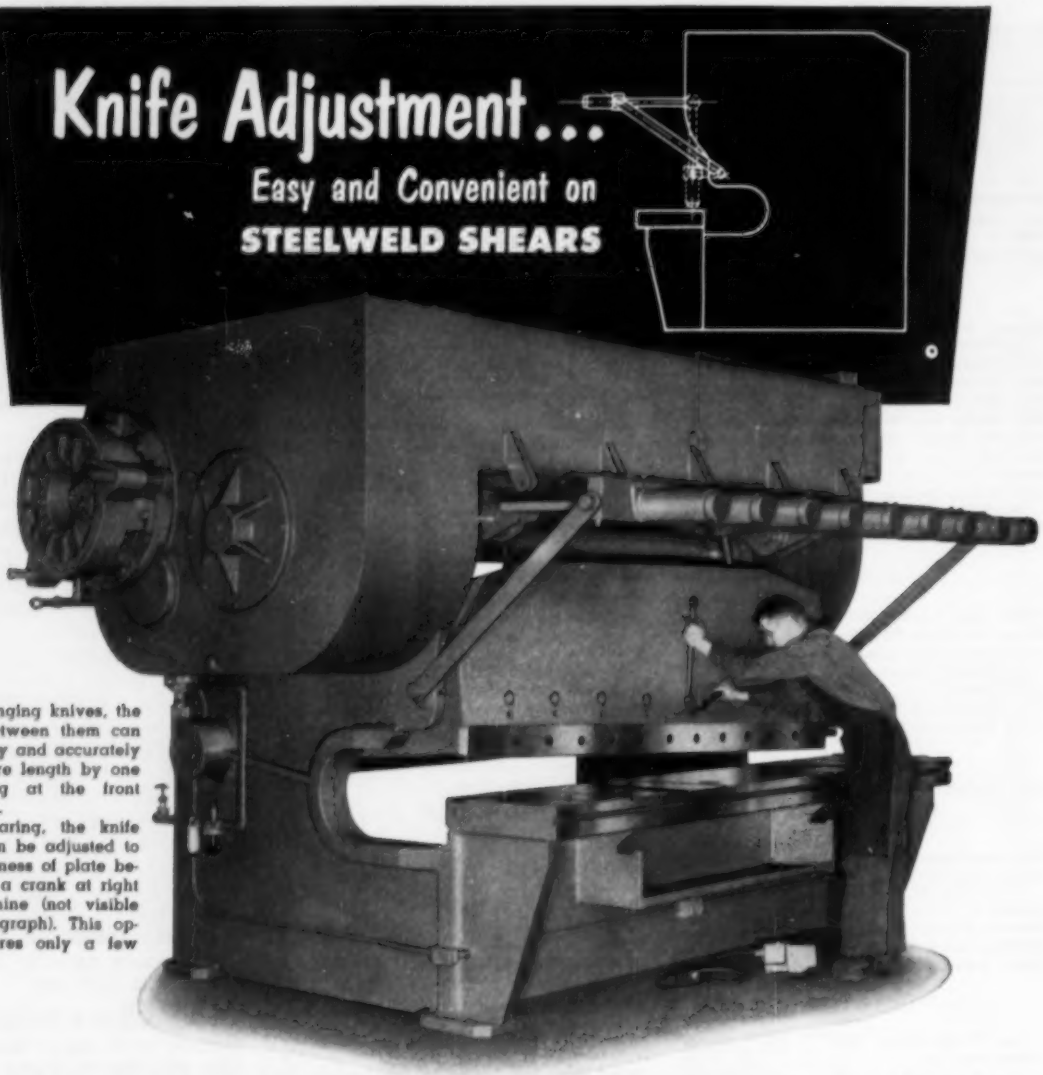
CINCINNATI 27, OHIO

*"Gears — Good Gears Only"*

CINTI

# Knife Adjustment...

## Easy and Convenient on STEELWELD SHEARS



When changing knives, the clearance between them can be set quickly and accurately for their entire length by one man working at the front as illustrated.

When shearing, the knife clearance can be adjusted to suit the thickness of plate being cut with a crank at right end of machine (not visible in this photograph). This operation requires only a few seconds.

When the knives on a Steelweld Shear are being set parallel from one end to the other, it is not necessary to have one man at the rear of the machine turning adjustment bolts, with another man at the front gauging the knife clearance. Nor is it necessary to work between or behind the hold-downs in hard-to-reach places.

On Steelwelds the hold-down beam can be lifted out of the way and all knife adjustment bolts reached from the front of the machine. As each bolt is turned, the clearance can be checked at once. One man can make the entire adjustment in a small fraction of the time usually required.

After the knives have been set for parallel, the clearance between them can be adjusted to suit various plate thicknesses to obtain the best possible cuts. This can be done in a few seconds by turning a crank and watching a dial indicator.

Because knife adjustments have been made so convenient on Steelwelds, shear operators will make them gladly and without hesitation. This contributes greatly to accuracy and quality of cuts and assures long knife life.

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*7838 EAST 282nd STREET, WICKLIFFE, OHIO*

**STEELWELD PIVOTED BLADE SHEARS**

## You Name It—Thousands of Ratings

# From 1/8 to 400 H. P.

**See MASTER** for a selection of motor drives that you can get nowhere else—for specialized power drives unequalled for flexibility, compactness and performance. See Master for the right horsepower, right shaft speed, right mounting features—to add salability to your products, efficiency to your plant equipment.

Master components are designed to combine in one compact unit to suit your needs exactly—all the way up to 400 H. P. Just ask us for information.

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|---|---|
| **Motor Ratings** | ⅛ to 400 H.P. All phases, voltages, and frequencies. |
| **Motor Types** | Squirrel cage, slip ring, synchronous, repulsion-start induction, capacitor, direct current. |
| **Construction** | Open, enclosed, splash-proof, fan-cooled, explosion-proof, special purpose. |
| **Speeds** | Single-speed, multi-speed, and variable speed. |
| **Installation** | Horizontal or vertical, with or without flanges and other features. |
| **Power Drive Features** | Electric brakes (2 types)—5 types of gear reduction up to 432 to 1 ratio. Mechanical and electronic variable speed units—fluid drives—every type of mounting. |

**THE MASTER ELECTRIC COMPANY**
**Dayton 1, Ohio**

MASTER ELECTRIC MOTORS

# You mean what you say, when you say "TIMKEN"

IF you are content with just any old kind of tapered roller bearing, steel or rock bit, of course you don't specify "Timken". By the same token, when you want highest quality you don't specify anything *but* "Timken". To make sure you get what you want—to safeguard your reputation and ours—we stamp "Timken" on every product we make. When you say "Timken" we know you *mean* a product made by the Timken Company . . . because, as everyone is aware, "Timken" is a trade-mark, not *just a type of product.*

When you purchase tapered roller bearings, alloy steel bars, seamless steel tubing or removable rock bits, always look for this famous legal identification. When you see it, you know there are over 55 years of experience behind it. When you *say* it, you're saying exactly what you mean: "I want the best." The Timken Roller Bearing Company, Canton 6, Ohio. Canadian plant: St. Thomas, Ontario. Cable address: "TIMROSCO".

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TRADE-MARK REG. U. S. PAT. OFF.

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